DOCUMENT RESUME

ED 282 426 FL 016 724

AUTHOR Hargrave, Susanne, Ed.
TITLE Language and Culture. Work Papers of SIL-AAB, Series B, Volume 8.
INSTITUTION Summer Inst. of Linguistics, Darwin (Australia). Australian Aborigines Branch.
REPORT NO ISBN-0-86892-252-8
PUB DATE Dec 82
NOTE 242p.
PUB TYPE Collected Works - General (020) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC10 Plus Postage.
DESCRIPTORS Children; Color; Comparative Analysis; Concept Formation; Creoles; *Cultural Context; Cultural Traits; Ethnic Groups; Females; Foreign Countries; *Indigenous Populations; *Kinship; Language Research; Lexicology; Linguistic Theory; Literacy; *Mathematical Concepts; Social Values; Sociocultural Patterns; Structural Analysis (Linguistics); Uncommonly Taught Languages; *Vocabulary
IDENTIFIERS *Aboriginal People; Anindilyakwa; *Australia; Yanyuwa Possessives

ABSTRACT

Six papers on the relationship of language and culture in the Australian Aboriginal context are presented. "Some Thoughts on Yanyuwa Language and Culture" by Jean Kirton gives an overview of some language-culture relationships and examines seven kinds of possession in one language. "Nyangumarta Kinship: A Woman's Viewpoint" by Helen Geytenbeck outlines kinship and its terminology as learned by a field linguist for her work with this group. In "A Description of the Mathematical Concepts of Groote Eylandt Aborigines," Judith Stokes describes an Anindilyakwa mathematical language in its cultural context, refuting popular generalizations about the limited counting ability of the Aboriginal people. "Facts and Fallacies of Aboriginal Number Systems" by John Harris criticizes anthropologists' and linguists' neglect of and bias concerning existing data about the mathematics of Aboriginal groups. In "Aboriginal Mathematical Concepts: A Cultural and Linguistic Explanation for Some of the Problems," Barbara Sayers suggests that the mathematical problems of some Aboriginal schoolchildren are real, but have a cultural rather than linguistic basis. "A Report on Colour Term Research in Five Aboriginal Languages" by Susanne Hargrave describes and presents preliminary analyses from a research project on color terminology. (MSE)

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WORK PAPERS OF SIL-AAB

Series B Volume 8

LANGUAGE AND CULTURE

Editor: S. Hargrave

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Summer Institute of Linguistics
Australian Aborigines Branch
Darwin
DECEMBER 1982

Language and culture.

Includes bibliographies.
ISBN 0 86892 252 8.

[1]. Aborigines, Australian - Languages.
[2]. Aborigines, Australian - Civilization.
I. Hargrave, Susanne. II. Summer Institute of Linguistics. Australian Aborigines Branch. (Series: Work papers of SIL-AAB. Series B; v.8).

499'.15

© SUMMER INSTITUTE OF LINGUISTICS 1982

ISSN 0157-5066
ISBN 0 86892 252 8

PREFACE

These Work Papers are being produced in two series by the Summer Institute of Linguistics, Australian Aborigines Branch, Inc. in order to make results of SIL research in Australia more widely available. Series A includes technical papers on linguistic or anthropological analysis and description, or on literacy research. Series B contains material suitable for a broader audience, including the lay audience for which it is often designed, such as language learning lessons and dictionaries.

Both series include both reports on current research and on past research projects. Some papers by other than SIL members are included, although most are by SIL field workers. The majority of material concerns linguistic matters, although related fields such as anthropology and education are also included.

Because of the preliminary nature of most of the material to appear in the Work Papers, these volumes are being circulated on a limited basis. It is hoped that their contents will prove of interest to those concerned with linguistics in Australia, and that comment on their contents will be forthcoming from the readers. Papers should not be reproduced without the authors' consent, nor cited without due reference to their preliminary status.

Views expressed by the authors are not necessarily those of SIL.

Research resulting in this volume was partially funded by grants from the Department of Aboriginal Affairs.

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INTRODUCTION TO SERIES B VOLUME 8

SIL is primarily an applied-linguistics organisation, with goals in translation and literacy. As such, it cannot ignore the cultural context of language, particularly since SIL fieldworkers carry out their research and goals in an ongoing language-culture situation. For these reasons it is appropriate that SIL-AAB personnel share some ideas and insights in a 'language-culture' work papers volume. We are also pleased to include two papers by non-SIL contributors, Judith Stokes and John Harris, both of whom have had much experience in the Aboriginal language-culture context.

In the first paper Jean Kirton shares insights she has gained during the dual process of learning Yanyuwa language and culture at Borroloola. Though not claiming that she is expressing an emic (insider's) viewpoint, Jean has been careful to check out her observations and tentative conclusions with a Yanyuwa speaker, Nero Timothy. In exploring the interrelationships between language and culture, there are always the dangers of stating the obvious and/or making unwarranted statements of causation. Jean has aimed to underscore the importance of relating language study to the local culture, demonstrating that linguistic data can be better understood when its cultural context is known.

Long before the use of such interdisciplinary labels as 'cognitive anthropology', 'sociolinguistics' and 'anthropological linguistics', both linguists and anthropologists were interested in kinship terminology as an interface of language and culture. Helen Geytenbeek's paper on Nyangumarta kinship has grown out of her need as a field linguist to speak and act correctly in the Nyangumarta community. Helen shares the view of Nyangumarta kinship which she has had to learn—that of a female member of the group.

Cross-cultural education in mathematics has often been a frustrating experience for both teachers and students. Part of the problem has been the lack of knowledge of, or appreciation for, non-Western approaches to mathematics. Judith Stokes' paper is an extensive description of Anindilyakwa mathematical language and its cultural context which refutes popular generalisations about the limited counting ability of Aboriginal people. Judith is to be commended for the amount of data she has collected and for her efforts to gain due recognition for Anindilyakwa mathematical language and concepts.

John Harris believes that Judith's paper is 'the first substantial discussion of the mathematical concepts of an Aboriginal group which has ever been published', and he finds fault with linguists and anthro-

pologists who have had access to such data for other Aboriginal groups but for various reasons have not made it known. Their neglect has allowed prejudiced views of Aboriginal mathematics as 'primitive' to continue unchecked, often with the accompanying view that 'primitive mathematics' is primary evidence of cultural inferiority. John's paper outlines how biased statements about Aboriginal mathematical abilities have developed and continued to the present day, and he cites data from several Aboriginal languages to correct such biases.

However, a deeper understanding of Aboriginal mathematics does not mean that differences between Western and Aboriginal approaches to mathematics are henceforth discounted. As Barbara Sayers' paper recognises, there are still frustrations and problems for many Aboriginal children learning mathematics in school. Barbara believes that the 'problems' are primarily cultural rather than linguistic: a hunting and gathering people have no need for highly developed and precise mathematical calculations and therefore should not be expected to have developed them. The perceptual and cognitive skills will be in different areas more appropriate to a hunting and gathering way of life. Barbara offers several suggestions to those teaching mathematics to Aboriginal children, suggestions which take into account the concepts and teaching styles of Aboriginal culture. Though their approaches are quite different, both John and Barbara are concerned that Western educators know more about Aboriginal culture and that they accept Aboriginal mathematical concepts and language on their own merit rather than judging them from a Western ethnocentric viewpoint.

As this introduction has indicated, the first five work papers in this volume illustrate the interdependence of language and culture. The reader will have to judge how much the final paper illustrates that same interdependence. It is a partial report of a research project undertaken to find out to what extent the development of colour terminology is culturally determined. The data gathered from five Aboriginal languages by SIL fieldworkers are inconclusive as to the relationship between culture and colour vocabulary, but they certainly illustrate the complexity of language-culture research.

Susanne K. Hargrave
Volume Editor

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Work Papers of SIL-AAB
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December 1982

SOME THOUGHTS ON YANYUWA LANGUAGE AND CULTURE

Jean Kirton, with Nero Timothy

Language reveals the culture of its speakers. The work of learning a language effectively involves learning something of the culture simultaneously, and one of the joys of learning Yanyuwa[1] has been to discover aspects of the people's way of life and thought reflected in the language. The tentative analysis offered here is based primarily on the author's linguistic data and her observations of the Yanyuwa people's way of life. Nero Timothy has verified the linguistic data in the paper and has expressed his agreement with the approach taken.

The paper is presented in two parts. The first part briefly considers seven areas in which traditional Yanyuwa culture has influenced the language to a significant extent, and presents an eighth area in which traditional beliefs may well have exerted an influence. The second part discusses in greater detail one particular area of the Yanyuwa language, that of possession marking, which reflects the Yanyuwa way of life and world view. The material presented is summarised in two charts at the conclusion of the paper.

PART I: OVERVIEW OF SOME LANGUAGE-CULTURE RELATIONSHIPS IN YANYUWA

1. RELIGION

Initiated Yanyuwa men have responsibility for religious ceremonial life and they hold the sacred knowledge of their people. Part of this special knowledge is a secret vocabulary — alternative names used exclusively by the men for objects known to the women only by their common names, and sacred names for objects which are secret from the women. As a woman, the author does not know this vocabulary and so is unable to illustrate it (nor would she wish to, since this would be unethical). The presence of this alternative vocabulary is merely noted.

2. KINSHIP AVOIDANCE

In the social life of the people there is formal avoidance of certain relatives. Avoidance relationship occurs between sons-in-law and mothers-in-law, fathers-in-law and sons-in-law, brothers and sisters, men in brother-in-law relationship, and women in sister-in-law relationship. If speech is permitted in the specific relationship, then avoidance speech must be used. This involves a separate set of stems for the general content words. The same syntax and morphology applies as in normal speech, that is, sentences and words are constructed in the same way, and generally the prefixes and suffixes of common speech are used.

In the following two examples the avoidance utterance is asterisked. (Examples are given throughout in the Yanyuwa practical orthography.)[2]

Kanda-atharri rra-ardu.

* *Kanda-mardungka rra-kuyaji.*

(She-be:cold) (f-child)

'The girl was cold.'

Kilu-arrkanu lhuwa nyu-rduwarralu.

* *Kilu-nguthuma mimarnu nyu-marrurulu.*

(it:he-spear) (snake) (m:nnom-initiated:man-erg)

'The initiated man speared the snake.'

3. CONTRASTIVE ROLES OF MALE AND FEMALE

The physical development of both boys and girls was observed to determine when they were ready for introduction to adult responsibilities, girls for marriage and domestic responsibilities,

boys for initiation and entrance into manhood and the commencement of religious training. Men were hunters of game — sea turtle and dugong (sea-cow), kangaroo, wallaby and emu. Women were food gatherers and hunted for smaller creatures — goanna and lizards, lagoon turtle. The roles of men and women were strongly contrastive.

These contrastive male and female roles in society are paralleled in the language by contrastive dialects used by male and female speakers (the sex of the hearer is irrelevant). The same word stems are used in both dialects, but class-marking prefixes for the male and masculine noun classes (Kirton 1971) are affected. Not only noun prefixes are affected but also prefixes on noun modifiers and verbs, and pronominal morphemes, all of which mark agreement with the class of the noun. In the following examples the women's dialect is given first followed by the men's.

Nya-ja nya-yalkuyi nya-wukuthu, kiya-alarri baji ji-wurnda-a.

Jinangu Ø-yalkuyi Ø-wukuthu, ka-alarri baji ki-wurnda-a.

(This m-young:man m-short he-stand there msc-tree-by)

'This young man, the short one, stood there by the tree.'

Ki-wingka kari-a Ø-babalu. Kanyinju-athama ji-babalu-ngku.

Ka-wingka kari-a Ø-babalu. Kilu-athama ki-babalu-ngku.

(It-come from-west msc-buffalo him:it-chase msc:nnom-buffalo-erg)

'A buffalo came from the west. The buffalo chased him.'

The contrastive roles of males and females are further paralleled in the language by separate male and female noun classes which are then in contrast with the other noun classes in the language: (female class) *rra-nhanawaya 'woman', rra-bardibardi 'old woman', rra-ardu 'girl'; (male class) nya-mirningiya 'man', nya-malbu 'old man', nya-ardu 'boy'.*

4. CONSERVATION OF SPECIES

Within the culture there is an awareness of the need to conserve those species endangered by hunting. Certain Yanyuwa men have a *jungkayi* manager relationship to particular species related to the *yijan* 'dreaming' beings. The *jungkayi* relationship involves a protective responsibility. In practice, for example, the *jungkayi* associated with the groper fish 'dreaming' has a responsibility to see that only those groper needed for food are taken from the river.

In the language, living species are normally assigned to masculine or feminine classes. Generally the whole species is classified as

masculine or feminine, regardless of the sex of specific members of the species — additional reference can be made to distinguish male or female if this is in focus. But certain species, including those which are depleted by hunting, are distinguished in the language according to the male and female of the species. As the Yanyuwa learn the language they are simultaneously learning to distinguish the male and female of the species endangered by hunting:

Ø-nangurrbuwala	'male mountain kangaroo'
a-jurnabu	'female mountain kangaroo'
Ø-ngardarda	'male coastal wallaby'
a-malurrungkurru	'female coastal wallaby'
Ø-warrikundayangu	'male sea turtle'
a-tharra	'female sea turtle'
Ø-waliki	'male dugong (sea-cow)'
a-kurlakurlawija	'adult female dugong'
a-wurduwu	'pregnant dugong'
a-bayawiji	'dugong cow holding her young'

The language, then, draws attention to the sex of these creatures in two ways — by providing separate stems for the male and for the female, and by further marking the stem with the relevant masculine or femine prefix.

5. KINSHIP RELATIONSHIPS

Classification of kin into three separate noun classes and an additional subclass highlights some of the contrastive roles assigned to groups of kin within the culture. The classification is described in Part II of this paper. There is much additional complexity in the kinship system, but what is marked on the language is significant.

6. MARKING CULTURAL SIGNIFICANCE

In his paper on 'Noun Classes', Dixon (1968) postulates that 'transfer' of an items class membership away from other entities of the same kind may mark some 'important property . . . most often "harmfulness"'. This explanation has helped the author understand what appeared to be erratic classification in Yanyuwa. For example, it explained why the stinging jellyfish *na-walkurrarra* appeared in the *na-* arboreal class primarily consisting of inanimate items, and not in the masculine or feminine classes with the other animate creatures.

Similarly the verb stem *tha* 'bite, eat (flesh)' is erratic in its occurrence. Verbs which take objects normally occur in the transitive verb class and are constructed as transitive verbs marking both subject and object. The stem *tha*, however, is normally constructed as an intransitive verb marking subject only, although it occurs in a transitive clause construction with potential for an object. However, if it is a living person who is bitten or the flesh of a dead person which is eaten, the verb is then constructed as a transitive verb. The significance of eating or biting a human has thrown *tha* into a small subclass of verbs, generally constructed as intransitive verbs but occurring in transitive clause constructions:

Kiwa-tha ni-warnnyi. 'He ate some meat.'

(he-eat msc:its-flesh)

Kanyila-tha niya-warnnyi. 'He ate/bit his flesh.'

(him:he-eat his-flesh)

This principle of transfer or displacement out of the expected class or out of normal position in an utterance functions throughout the language to indicate what Yanyuwa speakers regard as focal.

7. SIGNIFICANCE OF LOCATION AND DIRECTION

For a people whose law required death of those who trespassed into sacred areas, it was essential to know and remain in safe territory. In an area where months may pass without rainfall, it is essential to survival to remain within reach of available water. As a number of non-Aborigines have discovered to their cost, to be lost in outback Australia may well mean to perish.

For the Yanyuwa, the very process of hearing and speaking their language trains the people to be consciously aware of their location, relative location and directions. When the author was learning to speak Yanyuwa, her teachers were constantly and patiently prompting her to add essential locative or directional information which she had omitted. If she commented, *Nya-bardarda jiya-warrkanji,* 'The baby is crawling', a Yanyuwa friend would hasten to add *akarramba* 'on the east side'. And her statement, *Julaki ki-yibanda,* 'The plane landed', was completed by her companion's addition, *ngamala* 'in the south'. When she would have said that a dog they were watching ran around the house, her Yanyuwa teacher commented that it went southwards on the east side. These statements in the language are linguistically incomplete until the locative and/or directional information is included.

In the author's culture, time is of great significance and English is

rich in its capacity to detail time. In Yanyuwa culture time is of minimal significance and references are fewer and more general. But in Yanyuwa culture it is vital to be oriented to the physical environment and the language is rich in its capacity to detail location and direction.

8. SIGNIFICANCE OF THE 'DREAMING'

The Yanyuwa concept of *yijan* 'dreaming' includes an eternal realm and eternity as a time period which overlaps with this world and time. There is an interrelating of spiritual beings and physical ones (such as people, birds or animals, reptiles or fish, trees or plants, winds), and there are focal *yijan* sites and a surrounding area of the country.

It seems that 'dreaming' versus 'non-dreaming' may be associated with two first-order verb suffixes (suffixes which immediately follow the verb stem), *-ntha* and Ø. Yanyuwa verb suffixes carry meanings associated with tense and mood (Kirton 1978), and *-ntha* and Ø are described as mood orientation suffixes and are labelled 'recountive mood' and 'conversative mood'. Suffix *-ntha* is the mood of leisurely recounting of things of significance, Ø is the mood of casual conversation and interchange. This is an over-simplification — the meaning cannot be so clearly defined — but *-ntha* seems to have *yijan* 'dreaming' overtones and Ø 'non-dreaming'.

The recountive mood is basic to *yijan* narratives, to discourses telling of traditional and customary activities. It is the mood of those things that always were and those things that are expected always to be. It is the mood of the continuing things outside the present or of the things people are exhorted continually to do. It is the mood when focus is on the state of being rather than on the action of the subject.

Conversative mood generally refers to individual actions that are associated with the past, present or future, those actions with minimal eternal significance. This is the mood most frequently used in describing everyday personal experiences, the mood of general conversation and gossip, the mood of single completed actions (including single completed actions in 'dreaming' stories). This is the mood of the domestic details of life, of the actions which have an immediate significance to individuals but which have little relevance to eternal considerations or which are incidental to them. Specifically, recountive mood suffix *-ntha* co-occurs with past and future customary tenses, with the immediate future (prediction based on what is customary perhaps?), with prohibition, and with exhortation to always act in a certain way. It also co-occurs with all participle forms. The conversative mood suffix Ø co-occurs with

general past, present and future tenses and with present imperative.

It is the writer's conjecture, then, that these two suffixes may well function to label life's actions as significant or insignificant insofar as they relate to the eternal.

PART II: SEVEN KINDS OF POSSESSION IN YANYUWA

The Yanyuwa language distinguishes seven kinds of possession. Possession marked within the word indicates the closest kind, inalienable possession. The use of a free pronoun or possessive pronoun within a phrase indicates possession which is potentially transferable, alienable possession. There are five categories of inalienable possession and two categories of alienable (see chart 2 at end of paper). The purpose of this section is to describe the Yanyuwa view of possession as it is demonstrated by the language.

1. INALIENABLE POSSESSION

Inalienable possession is marked by attaching a pronominal possessor affix to the possessed noun stem (Kirton 1971). Different sets of pronominal possessor affixes (Kirton 1970) demonstrate five kinds of alienable possession. Body-parts are owned in a different way from kin, and kin are grouped into four different categories which partly define the kind of behaviour appropriate to the relationship.

1.1 BODY-PART POSSESSION

A living person or animal possesses body-parts in a unique and individual way and this fact is marked by using a distinctive set of possessor prefixes. These prefixes distinguish all the persons (first, second and third persons singular, dual and plural) and all the noun classes except the abstract class: male, female, masculine, feminine, food, aboreal. The latter four classes include inanimate entities but some of these possess 'body-parts' in an extended sense. A cave has a mouth: *na-ajinja narnu-mulu* (arb-cave arb:poss-mouth) 'cave mouth'. A tree possesses its bark: *Ø-wurnda ni-yirra*[2] (msc-tree msc:poss-skin/bark) 'tree bark'. A fruit tree possesses its fruit: *ma-mungku nu-wulaya* (fd-mango fd:poss-head) 'mango fruit'. A wave possesses its spray: *a-rumu nanda-rayal* (fem-wave f/fem:poss-sputum) 'sea-spray'.

Body-part meanings have been usefully extended to describe parts of vehicles, planes, buildings and other introduced items: *Ø-mudika ni-rarrama* (msc-car msc:poss-upper:leg) 'car wheel'; *Ø-barrawu ni-mulu* (msc-house msc:poss-mouth) 'door'. The central meaning of body-part class items, however, is shown in their possession by animate beings: *ngarna-mulu* (my mouth); *nda-wulaya* (your:s-head); *rra-ardu nanda-rarrama* (f-child f/fem:poss-upper:leg) 'the girl's leg'; *nya-malbu niya-mayi* (m-old:man m:poss-tooth) 'the old man's tooth/teeth'; *Ø-mardumbarra ni-mayi* msc-crocodile msc:poss-tooth) 'the crocodile's tooth/teeth'; *a-wangka nanda-ngurru* (fem-crow f/fem:poss-nose/beak) 'the crow's beak'.

The body-part list also includes certain additional items which are possessed in the same kind of way and so are included in the same category, for example, *wini* 'name', *ngalki* 'social group, "skin" group' (Kirton and Timothy 1977): *ngarna-wini* 'my name', *ngarna-ngalki* 'my "skin" group'.

1.2 KINSHIP POSSESSION

Possession of one's kin is a communally-shared possession. Others also possess the same people in the same or in a different relationship. A man's brother is brother to the other men in the same 'skin' group. But that brother is also an uncle, cousin, father, brother-in-law or some other kin to each other member of the community to which he belongs. Kin are inalienably possessed but each has an identity apart from the possessor and so the possession is in contrast to body-part possession and the language marks it contrastively.

Yanyuwa also indicates four different categories of kin by using different sets of possessor affixes, three sets of prefixes and one of suffixes. These categories have been labelled to identify something of the attitude of the possessor to the kin of each category.

1.2.1 INFORMAL KIN POSSESSION

A distinctive set of possessive prefixes, similar in form to possessive pronouns, is used to mark kin to whom one relates in a more informal way. These kin include mother, father, younger sibling, son, daughter, spouse. A slight irregularity in case-marking for *wangu* 'spouse' may indicate that there is a singularity in this particular relationship. Informal kin basic nouns (that is nouns in nominative case which have zero case-marking) consist of a class-marking prefix (to mark male, female, dual or plural), a possessor prefix, the class-marking prefix repeated in most occurrences, and the noun stem:

rra-ngatha-rra-wibi	(f-my-f-mother)	'my mother'
ny-inku-nya-biyi	(m-your:s-m-father)	'your father'
rr-iku-rra-ardu	(f-his-f-child)	'his daughter'
l-alunga-li-wangu	(pl-their:pl-pl-spouse)	'their spouses'

1.2.2 RESPECTFUL KIN POSSESSION

The kin to whom one relates with greater respect than to one's informal kin are those who have a greater measure of responsibility for one's training and discipline, and in major decisions affecting one's life — decisions relating to marriage for a woman and to initiation and ceremonial life for a man. These kin include older sibling, mother's brother, father's sister, and all grandparent categories (separate stems for mother's mother, mother's father, father's mother, father's father). It is noted that the possessor prefix set for this category is almost identical with that for informal kin possession but there is contrastive prefixation for first person singular possessor 'my'. The respectful kin possession noun then changes so that the two prefixes adjacent to the stem, marking possessor and class of kin, are replaced by the single prefix *ja*. Although this difference affects only this one person possessor, the co-occurrence of this change with the significantly different group of kin is taken to differentiate a separate category:

nya-ja-baba (m-my-elder:sibling)	'my elder brother'
my-inku-nya-ardiyardi (m-your:s-m-mother's:brother)	'your uncle'
rr-iku-rra-rnarna (f-his-f-father's:sister)	'his aunt'
l-alunga-li-murimuri (pl-their:pl-pl-paternal:grandfather)	'their paternal grandfathers'

1.2.3 FORMALLY-RESPONSIBLE KIN POSSESSION

The kin in the formally-responsible kin possession category are those in reciprocal relationship to the respectful kin, but excluding younger sibling (already included in informal kin). These therefore include niece and nephew (a man's sister's child or a woman's brother's child) and all categories of grandchildren.

Basic nouns referring to kin of this kind are constructed of a class-marking prefix, a possessor prefix similar in form to certain verb subject prefixes, and a noun stem. When the possessor prefix is *ka* 'your (s)' then an additional suffix *-nhu* is added to that construc-

tion. (This parallels the verb suffix *-nhu* which co-occurs only with second person singular subject for a verb with general past tense. It is the noun class-marking prefix and the function of the construction which defines the resultant form as a noun.):

nya-karna-ardima (m-my-nephew/niece)	'my nephew'
nya-ka-ardima-nhu (m-your:s-nephew/niece-*nhu*)	'your nephew'
rra-kilu-marrini[3] (f-his-daughter's child)	'his grandchild'
li-kalu-wuthayi (pl-their-daughter's:child)	'their grandchildren' (of women)

1.2.4 FOCUS AVOIDANCE KIN POSSESSION

In the traditional Yanyuwa community there are a number of reciprocal avoidance relationships requiring that there be no direct speech communication or that an avoidance vocabulary be used. These relationships are brother and sister, brothers-in-law, sisters-in-law, father-in-law and son-in-law, and mother-in-law and son-in-law. The one relationship of these focused on by distinctive marking of the noun is the mother-in-law—son-in-law relationship, and in this one instance in the language possession is marked by a suffix. The suffix is similar in form to the allative form of the free pronoun, for example, *yilalu* 'to him', *andalu* 'to her'. The noun marked for focus avoidance possession is constructed of a class prefix, noun stem and possessive suffix:

rra-kayibantha-ngathangkalu (f-mother/son:in:law-my)	'my mother-in-law'
rra-kayibantha-yindalu (f-mother/son:in:law-your:s)	'your mother-in-law'
nya-kayibantha-andalu (m-mother/son:in:law-her)	'her son-in-law'

2. ALIENABLE POSSESSION

Possession of things is a very different kind of possession from that of body-parts or kin. Things are exchangeable and may have only a limited period of usefulness. Ownership may be a much more temporary thing. In Yanyuwa this kind of possession is expressed in a phrase so that separate words express the possessor and the possessed. Alienable possession is also the relationship with people to whom one does not relate as kin, to outsiders, strangers, foreigners,

enemies. Two kinds of alienable possession are signalled in the language, loose possession and firm possession. The list of nouns which are possessed in either of these ways is basically a single list for both.

2.1 LOOSE POSSESSION

The loose kind of possession is expressed in a phrase consisting of the possessed noun and the possessor in the form of a free pronoun in the genitive case, for example, *alu-nga* (them-of/for) 'for them'. Things marked for possession in this way include food, clothing, radios, shelters, animals. Animals which live with the family group may be classified as kin, and also creatures which have a 'dreaming' affiliation are classified as kin. This again illustrates how cultural significance leads to a change from the linguistic class expected according to physical nature of the entity.

na-langundu ngatha 'a shelter for me/my shelter'
(arb-shelter of/for:me)

Ø-wabuda yiku 'water for me/my water'
(msc-water of/for:him)

Ø-arlku alu-nga 'fish for them/their fish'
(msc-fish them-of/for)

2.2 FIRM POSSESSION

Firm possession is expressed in a phrase consisting of the possessed noun and the possessor in the form of a possessive pronoun. A possessive pronoun is similar in form to the genitive free pronoun but it is additionally marked for the class of its referent. The singular possessive pronouns for 'your(s)', 'his' and 'her' additionally take the suffix *-ngu* which serves to mark this firmer degree of possession.

Firm possession describes both ownership of personal property and also a close association which may not necessarily be a permanent one. The relationship between a stockman on a cattle-station and the horse assigned to him by the 'horse-tailer' was expressed by firm possession. Things firmly possessed also include allotted portions of food, firesticks (traditionally used to make a fire), a woman's digging stick:

ma-ngarra ma-ngatha 'my food'
(fd-food fd-of/for:me)

Ø-wawi ny-iku-ngu 'his horse'
(msc-horse m/msc-his-*ngu*)

narnu-yuwa narn-alu-nga
(abs-law/custom abs-them-of/for) 'their law/their customs'

3. FINAL COMMENTS

In literature on Australian languages there is record of a suffix 'having' which occurs with various forms in a number of languages. This could be viewed as indicating a kind of possession. The comparable suffix in Yanyuwa is *-wiji* (which has variant forms according to the phonological context). It seems to the writer that its primary meaning in Yanyuwa is 'bearing' or 'carrying' rather than 'possessing', but another analyst may view *-wiji* as a further kind of marking for possession. In the following examples all the nouns are in the masculine class and the ∅ prefix has been omitted for simplicity:

arlku jamuka-wiji (fish whisker-*wiji*)	'a whiskered fish'
buluki wungu-wiji (bullock fat-*wiji*)	'a fat bullock'
waliyangu mulirli-wiji (island kangaroo-*wiji*)	'an island with kangaroos on it'

The significance of possessive marking is demonstrated by the noun stem *nganji*. The stem marked for possession occurs in the informal kin class and means 'kin, relation'. The stem unmarked for possession occurs as a simple noun and means 'stranger, foreigner, enemy':

nya-ngatha-nya-nganji (m-my-m-*nganji*)	'my kinsman'
nya-nganji (m-*nganji*)	'a stranger/an enemy'
li-wulanga-li-nganji (pl-their:d-pl-*nganji*)	'their kinsmen/their relatives'
li-nganji (pl-*nganji*	'strangers/enemies'

In conclusion, a list of examples of the seven kinds of possession is given using a first person singular possessor, the one which displays the maximum contrast:

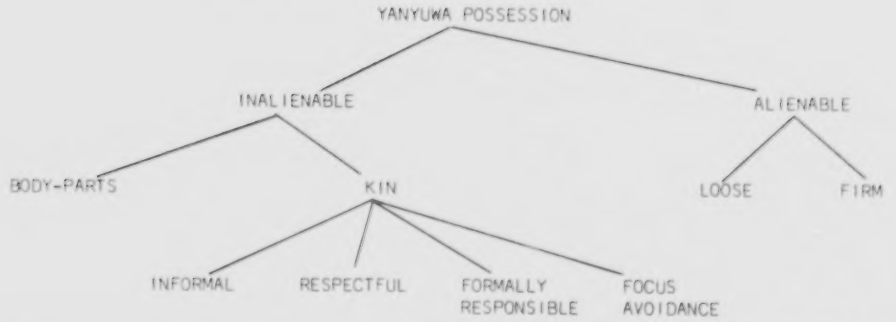
ngarna-manka (my-body)	'my body'
nya-ngatha-nya-biyi (m-my-m-father)	'my father'

nya-ja-baba (m-my-elder:sibling)	'my elder brother'
nya-karna-ardima (m-my-niece/nephew)	'my nephew'
nya-kayibantha-ngathangkalu (m-mother/son:in:law-my)	'my son-in-law'
Ø-awara ngatha (msc-country of/for:me)	'country for me/my country'
Ø-awara nya-ngatha (msc-country m/msc-of/for:me)	'my country/my own country'

CHART 1: YANYUWA CULTURE AFFECTING LANGUAGE

	Area of Culture Effecting Change	Area of Language Affected
1	RELIGION	SECRET VOCABULARY
2	KINSHIP AVOIDANCE	AVOIDANCE VOCABULARY
3	CONTRASTIVE ROLES OF MALE AND FEMALE (Male) (Female) religious responsibility / domestic responsibility hunting of game / food-gathering and hunting of smaller creatures	MEN'S AND WOMEN'S DIALECTS MALE AND FEMALE NOUN CLASSES
4	CONSERVATION OF SPECIES	MASCULINE AND FEMININE NOUN CLASSES SEPARATE STEMS FOR MALE AND FEMALE OF HUNTED SPECIES
5	KINSHIP RELATIONSHIPS	THREE NOUN CLASSES AND ADDITIONAL SUB-CLASSES
6	MARKING CULTURAL SIGNIFICANCE	IRREGULARITY IN THE LANGUAGE
7	SIGNIFICANCE OF LOCATION AND DIRECTION	OBLIGATORY REFERENCE TO LOCATION AND DIRECTION
8	SIGNIFICANCE OF THE 'DREAMING'	(possible explanation for) MOOD ORIENTATION SUFFIXES *-ntha* recountive mood (with 'dreaming' associations) Ø conversative mood (of incidental actions with minimal eternal significance)

CHART 2: SEVEN KINDS OF YANYUWA POSSESSION



NOUN CLASS POSSESSED	Class 8	Class 10 subclass	Class 10 subclass	Class 11	Class 12	Classes 1 - 7	
POSSESSOR AFFIX	Prefix set 1	Prefix set 2 regular	*ja-* 'my' variant	Prefix set 3	Suffix set	—	
EXAMPLES OF POSSESSED ENTITY	head	mother	elder sibling	grandchild	mother-in-law	food	allotted portion of food
	arm	father	mother's brother	niece	son-in-law	clothing	
	leg	son	father's sister	nephew		radio	horse allocated to rider
	name	daughter	grandparent	great-niece/ nephew		shelter	woman's digging stick
	fruit (of tree)	younger sibling	great-uncle/ aunt			animal	man's firestick (for making fire)
	wheel (of car)	- - - - -					
	door (of house)	spouse				stranger/ enemy	

FOOTNOTES

1 The Yanyuwa or Anyuwa people of Australia's Northern Territory are also known as the Yanyula (the name given them by their Garawa neighbours from the east) and the Wadiri (the name given them by their Mara neighbours from the north-west). Their traditional territory was the coastal strip from the Limmen River to an area opposite the Sir Edward Pellew Islands and including the islands. There are approximately 150 speakers of Yanyuwa and the Yanyuwa community is now centred at Borroloola, a small outback township on the MacArthur River.

The author, a field worker with the Summer Institute of Linguistics, has spent about 84 months with the Yanyuwa during the years 1963 - 1980. During that time Nero Timothy has contributed much to the author's understanding of Yanyuwa language and culture, and has co-authored a paper with her (Kirton and Timothy 1977). The author thanks the Yanyuwa people who have so generously shared their language and information about their culture. She is grateful to Dehne McLoughlin (formerly a field anthropologist with the Department of Museums and Art Galleries) for defining for her the role of *jungkayi* in the Yanyuwa community. Any errors in the record or in interpretation are the author's entirely.

2 Hyphens are used, beyond those in the practical orthography, to mark morpheme breaks. Examples are given in the women's dialect which shows the linguistic distinctions most clearly. The Yanyuwa phonology is described in Kirton 1967, Kirton and Charlie 1978.

3 A single English translation is given for most of the kin nouns, but several of them do have additional alternative meanings. For example, the stem *marrini* refers to a man's daughter's child and also to a woman's brother's daughter's child.

ABBREVIATIONS

abs	abstract (class 7 noun)
arb	arboreal (class 6 noun)
d	dual
erg	ergative case (marking transitive subject)
f	female class (class 1 noun)
fd	food (class 5 noun)
fem	feminine (class 3 noun)
m	male (class 2 noun)
msc	masculine (class 4 noun)
nnom	non-nominative case
poss	possessor
pl	plural
pres	present tense
s	singular
Ø	zero morpheme (that is, a significant lack of marking in a position in a word where marking otherwise occurs)
/	or
-	morpheme boundary
:	separates two or more words which combine to translate a single language morpheme

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Work Papers of SIL-AAB
Series B Volume 8
December 1982

NYANGUMARTA KINSHIP

A WOMAN'S VIEWPOINT

Helen Geytenbeek

0. INTRODUCTION

The Nyangumarta language is spoken by about 700 Aborigines along the northwest coast of Australia, between Port Hedland and Broome and inland around Marble Bar. Of this number about 500 claim it as their own language.

The majority of the Nyangumarta claim to speak the southern or inland dialect while the others speak the coastal dialect (called Ngulibardu and Wanyarli respectively in O'Grady and Mooney 1973:1). The terms 'inland' and 'coastal' refer to their original territories and do not necessarily reflect the current situation. Many of the coastal people now live at La Grange, but the inland Nyangumarta mostly live at Strelley Station and outcamps, Yandeyarra Station, and Port Hedland.

There are some differences in kinship terminology and section organisation between the two dialects. As far as I can ascertain the northern Nyangumarta use the same section organisation as the Garadjari who are the traditional owners of the country around La Grange. The southern or inland Nyangumarta follow the same basic system as some of the desert groups with whom they have close ties. Most of my knowledge of the kinship system has been gleaned from speakers of the inland dialect.

It is customary to describe kinship systems from the viewpoint of a male ego. However, this description of Nyangumarta kinship and section organisation is written from a woman's point of view. A man has different names for a few of his relatives. Brief reference is made to differing kinship terms used by male speakers.

This paper was originally written in 1978 and was updated in 1982. The material on which it is based was gathered at Marble Bar and Port Hedland between 1972 and 1978 during an effective field time of 44 months. It may be misleading to talk of the material being 'gathered'. Much of it was learned informally as I struggled to understand my relationship to others as an 'adopted' member of the Nyangumarta family.

It would be impossible to name everyone who has had a hand in my education in matters of Nyangumarta kinship. But the person who has spent the most time answering questions and trying to make the system clear is Mrs. Lily Darby. My special thanks to her.

1. SECTION ORGANISATION

The Nyangumarta are divided into four social groups or sections, and each person in the society belongs to one of them. A person's place in the society is determined by where his or her parents fit into the system. The diagram below shows the marriageable sections and the directions in which descent is traced when correct marriages are made. Marriageable sections are connected by an = sign. Arrows show lines of descent from the mother.

Thus a Karimarra man marries a Panaka woman and their children are Purungu. A Purungu man marries a Milangka woman and their children are Karimarra. A Panaka man marries a Karimarra woman and their children are Milangka. A Milangka man marries a Purungu woman and their children are Panaka.

Among the coastal or northern Nyangumarta the pattern is a little different. A person who is reckoned as Karimarra among the southern Nyangumarta is reckoned as Purungu in the north. A person who is Purungu among the southern Nyangumarta is known as Karimarra in the north. The diagram below shows correct marriages and lines of descent for the northern Nyangumarta.

Thus in the north a Purungu man marries a Panaka woman and their children are Karimarra. A Karimarra man marries a Milangka woman and their children are Purungu. A Panaka man marries a Purungu woman and their children are Milangka. A Milangka man marries a

Karimarra woman and their children are Panaka.

When a 'wrong' marriage is contracted there can be confusion as to where the children belong in the system. Elkin (1979:128-9), in discussing the section system of the north-west of Western Australia, states that 'in the minds of the natives its principle of descent is always based on the mother-child relationship...in any case of alternate or irregular marriage, the father is "thrown away"; that is, he is not considered...the child goes into the section to which it would belong, if the mother had married according to the normal rule.' Tonkinson (1978:49) has also found that this is the case among the Mardudjara (Marta Wangka). But according to my data, descent may be reckoned from the mother or the father. While it may be true that most people use the mother's section in reckoning the child's section, some use the father's. A certain ambivalence of outlook seems evident in remarks like the following concerning a man whose parents were married wrongly: 'He should be half a *nyupa* ('spouse') and half a *pujamu* ('son')'. In fact the man referred to has chosen to follow his father's section which makes him a *nyupa* to the speaker. It may be that the Nyangumarta view descent, in terms of the section system, as neither patrilineal nor matrilineal, but from both parents joined in a correct relationship.

2. KINSHIP TERMINOLOGY

Chart 1 gives the names of a woman's relatives and illustrates the lines of descent. Chart 2 shows how her relatives are distributed among the four sections. Taking A as the section to which Ego belongs, B will be her husband's section and C the section of her children. Comparing Charts 1 and 2, it is apparent that many of Ego's kin are related to her in more than one way. For example, if correct marriages have been made, Ego's MM is also her classificatory FFZ and Ego's husband is also classified as her MBS and FZS (see section 3).

A man calls his son-in-law *pujamu* (the same term he uses for 'son'). His terms for his grandchildren are different from a woman's terms. She calls her daughter's children *kamiji* and her son's children *kaparli*. But he calls his daughter's children *jamuji* and those of his son *karluji*.

Nyangumarta kinship terms refer not only to the immediate family, but also to classificatory relatives. The term that is used for 'mother' is used also for mother's sisters and for all females of the mother's generation level who belong to the same section as the mother. The term for 'father' is likewise extended to include all the males of one's father's generation level who belong to the

same section as father. The terms used for one's siblings are also applied to the children of anyone whom Ego calls 'mother' or 'father'. This extension of kin terms applies throughout the system. The only exceptions are for special terms applied to a limited number of people when men and women from marriageable sections are considered too close to marry.

From Chart 1 it can be seen that there are names for relatives on only four generation levels. The terms for relatives two generations above and two generations below Ego are the same. Children of one's grandchildren are called by the same terms as parents, uncles and aunts. In other words they are in the same sections as children of one's grandparents. Parents of grandparents are in the same sections as parents of grandchildren and are called by the same terms as children, nieces and nephews. In this way it is possible to have classificatory parents, uncles and aunts who are much younger than oneself. Conversely it is common to have classificatory children, nieces and nephews who are much older than oneself.

There are three terms listed by O'Grady and Mooney (1973:8) as Nyangumarta kin terms of unclear meaning. They are ***murrkangunya***, ***malyurta*** and ***nyirtingunya***. (The term ***kartapal*** which is listed as an alternant for ***malyurta*** I have been told is a Nyamal term.) The use of these terms is certainly not confined to Nyangumarta. Tonkinson (1978:46) cites their use among the Mardudjara (Martu Wangka). They are not kinship terms in the normal sense: they do not show a person's relationship to another, but rather his or her place in the family. ***Murrkangunya*** is a term for the first-born, ***nyirtingunya*** (usually shortened to ***nyirti***) is a term for the youngest member of a family, and ***malyurta*** is used for all the offspring in the middle. These terms can be used for address or reference. They are frequently used instead of the appropriate kin term to address another.

Chart 1: NYANGUMARTA KINSHIP

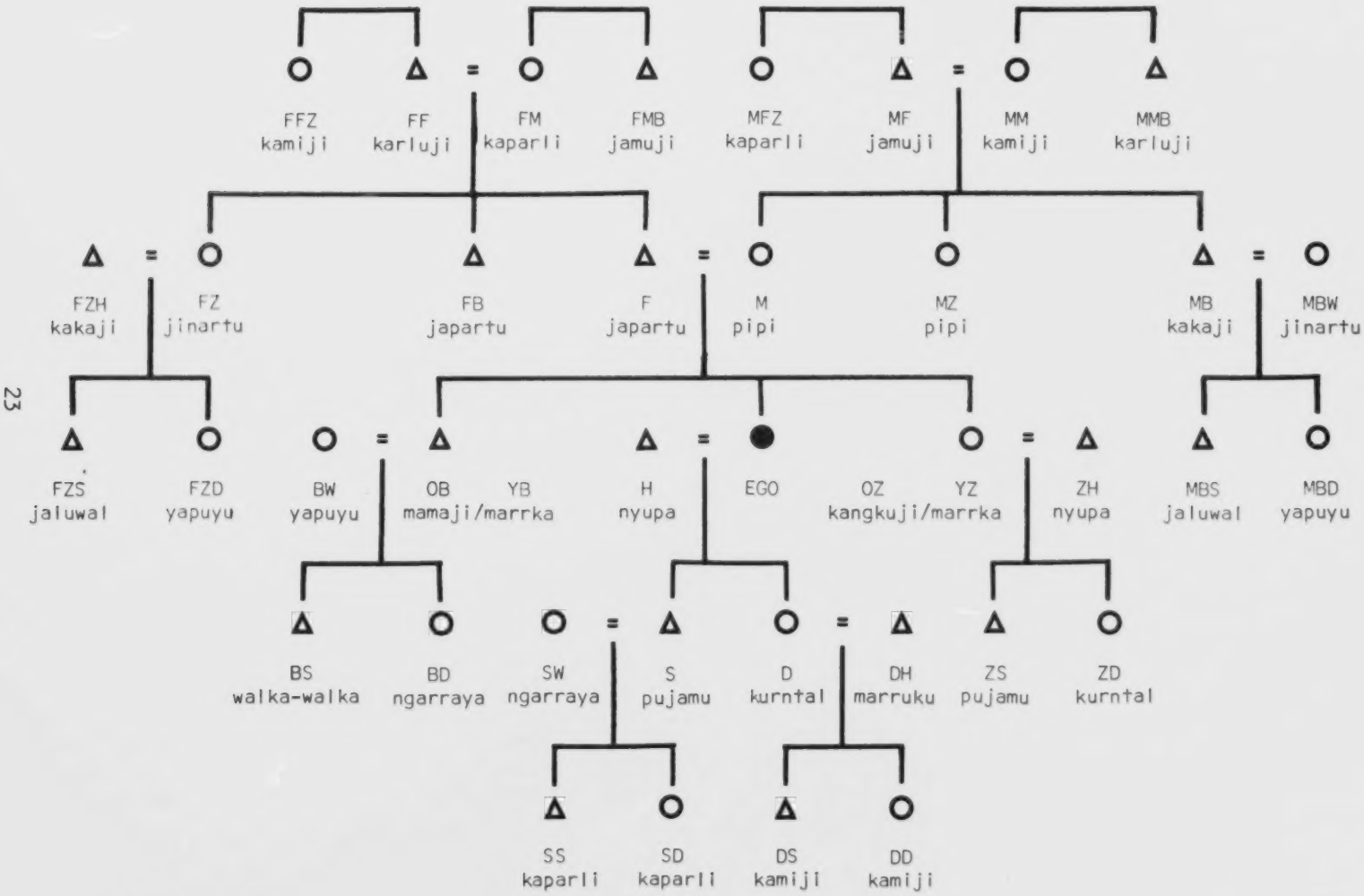

CHART 2

Distribution of Ego's Kin (Chart 1) in the Section System

A		B	
Ego		*nyupa*	H, ZH, MBS, FZS
mamaji	OB	*yapuyu*	MBD, FZD, BW
kangkuji	OZ	*kaparli*	FM, MFZ, SS, SD
marrka	YB, YZ	*jamuji*	MF, FMB
kamiji	MM, FFZ, DD, DS	*jaluwal*	unmarriageable MBS, FZS
karluji	FF, MMB		

C		D	
pipi	M, MZ	*japartu*	F, FB
kaka(ji)	MB, FZH	*jinartu*	FZ, MBW
kurntal	D, ZD	*ngarraya*	BD, SW
pujamu	S, ZS	*marruku*	BS, DH
		walka-walka	BS, HZS (too close for D to marry)

ABBREVIATIONS:

B brother	S son
Z sister	D daughter
F father	H husband
M mother	W wife
O older	Y younger

COMBINATIONS: (example)

MBD = mother's brother's daughter

2.1 TERMS OF REFERENCE

Most of the terms used in Charts 1 and 2 are terms of both address and of reference. As a woman is not supposed to directly address her son-in-law, her term for him—*marruku*—is only a term of reference.

Some of the other terms listed are inappropriate as terms of reference in certain situations, particularly when referring to one's own or another's spouse. The term *nyupa* 'spouse' is used in conversation between Ego and her mother-in-law or father-in-law to refer to Ego's spouse (their son). But when a woman's parents talk to her about her spouse they refer to him as *yinini*. O'Grady and Mooney (1973:8) call these terms 'shared' reference terms, because they take into account the relationship of the hearer (the addressee) as well as the relationship of the speaker to the person referred to.

There are other examples of shared reference terms in Nyangumarta. People of the same generation level (except for women who are sisters-in-law or men who are brothers-in-law) refer to their own spouse or the spouse of the other person as *pinaji*. Women who are in sister-in-law relationship or men who are brothers-in-law refer to their own or the other's spouse as *nyukunu*. The term of reference for spouse between people who are two generations apart is *yakan*.

The term *yarruwa* is used by a woman when speaking to her unmarriageable *jaluwal* about his wife. As *jaluwal* is a reciprocal term, I expect that *yarruwa* is also used by a man when speaking to his *jaluwal* about her husband, but I do not recall hearing a man using it that way. Note that my understanding of *yarruwa* differs from that of O'Grady and Mooney. (O'Grady and Mooney 1973:9 list *yarruwa* as used by a man when addressing his B in reference to BW, when B and BW are of alternate generations.) This has proved an elusive term to investigate and I am far from satisfied that I know all there is to be known about it. Perhaps part of the reason for seemingly conflicting evidence concerning its meaning is that it is used with a different meaning in at least one neighbouring language. In Martu Wangka *yarruwa* is used as the equivalent of Nyangumarta *pinaji*. It is not unusual for terms to be borrowed from other languages.

The term *punarri* 'father' is used between a woman and her brother's children to refer to their father (her brother).

O'Grady and Mooney list one other shared term of reference—*nyarrumpaji*—which is supposed to be rare and 'not La Grange

Nyangumarda'. I have been told that the word is Nyamal and the corresponding Nyangumarta term is *partanguji*. I am not familiar with either term. If I understand the explanation correctly, *partanguji* is used between Ego and someone in her marriageable section to refer to a brother or sister of the addressee.

This list of terms of reference is probably not exhaustive. In the future more could come to light.

2.2 RECIPROCAL TERMS

People of the same sex who are two generations removed from each other use identical reciprocal terms for each other. A woman and her MM (or her DD) address each other as *kamiji*. A woman and her FM (or SD) address each other as *kaparli*. A man and his MF (or DS) address each other as *jamuji*. A man and his FF (or SS) address each other as *karluji*.

However, people of the opposite sex do not always use identical reciprocal terms for each other. When children are young they do use identical reciprocal terms with their grandparents. Thus a woman calls all her daughter's children *kamiji* and all her son's children *kaparli* regardless of their sex, and they reciprocate with the same terms. Likewise a man has only two terms for his young grandchildren: *jamuji* for his daughter's children and *karluji* for his son's children.

When the children reach adolescence, however, it is usual for terms for them to be adjusted to show sex distinctions. A woman will continue to call DD *kamiji*, but will call DS *karluji*, while both will call her *kamiji*. She will still call her SD *kaparli* but her SS *jamuji*, and both will call her *kaparli*. In the same way a man will call his adolescent or adult DD *kaparli* while she calls him *jamuji*. He will call his SD *kamiji* while she calls him *karluji*.

This may be the reason why O'Grady and Mooney (1973:4) show (for northern Nyangumarta) Ego using all four terms for grandchildren. But among the southern Nyangumarta each person has only two terms for small grandchildren.

The mother-in-law to son-in-law relationship uses identical reciprocal terminology. A woman refers to a man who is an actual or potential spouse for her daughter as *marruku*, and he refers to her as *marruku*. If he is too close to marry her daughter they refer to each other as *walka-walka*.

Between a woman and her spouse or potential spouse the reciprocal term *nyupa* is used. But if a man and woman are in marriageable sections but are considered unmarriageable, they address each other as *jaluwal*.

2.3 DUAL AND PLURAL TERMINOLOGY

Nyangumarta has an extensive system of dual and plural terminology. There are at least three different kinds of dual terms:

1. Duals and plurals may be formed by adding the ordinary dual and plural suffixes, *-jirri* and *-rrangu*, to singular kin terms, e.g.:

pipijirri	'two mothers'
pipirrangu	'more than two mothers'

2. There are terms of reference for married couples which are derived from singular forms, e.g.:

yakankarra	'a married couple, one of whom is *yakan* to Ego'
pinarra	'Ego's *pinaji* and spouse'
yarruwarra	'Ego's *yarruwa* and spouse'

3. There are paired terms for two related individuals, e.g.:

rampanu	'a man and his nephew'
yalyjalirra	'two siblings'

The first two categories above are terms which are seen from Ego's viewpoint, i.e. the terms are based on Ego's relationship to one or more of the individuals referred to. Examples I have of forms from the third category show that these terms are not necessarily used from Ego's viewpoint, as the examples given indicate. Category 3 is a very large one and a thorough study of the subject is beyond the scope of this paper. The reader is referred to a long section on dual and plural terminology in O'Grady and Mooney 1973: 9-21.

3. MARRIAGE

There are two possible correct choices for a marriage partner for a woman. One is the son of her classificatory mother's brother and father's sister. She may not marry the son of her mother's actual brother or the son of her father's actual sister. But she may marry the son of a 'close' mother's brother. The precise meaning of *walyja* 'close' is not understood. The other choice is a man who is a classificatory *jamuji* — MF or FMB. A man who is *jamuji* is still in the same section as one who is MBS or FZS.

Sackett (1976:44-54) says that prior to contact the Aborigines of the Western Desert had a prescribed marriage with MBD/FZD who was genealogically and geographically distant, but now among the Wiluna

group the practice of getting a partner who is geographically distant is less common. There is some evidence to suggest that among the Nyangumarta the ideal marriage is still with a partner from another community, but I have not had the opportunity to observe how rigorously the practice is carried out.

3.1 WRONG MARRIAGES

Wrong marriages are tolerated, though not approved. No statistics are available, but the proportion of wrong marriages is considerably higher than Tonkinson observed among the Jigalong community (1974:51).

There is one way that a wrong union (not marriage) can be sanctioned. If a woman's husband gives permission for his wife to have a boyfriend she may have one who is not 'straight' for her, even while she continues living with her husband.

3.2 ARRANGEMENT OF MARRIAGES

The practice of promising a girl to a man while she is still an infant is widespread even today. The promised girl is called his *pilyurr*. What proportion of men actually marry their *pilyurr* I do not know.

Marriages are arranged by the girl's parents in consultation with others. An eligible man may be approached by the girl's parents. But if he does not want the girl he can say so and the parents must look elsewhere for a husband for their daughter.

In the past it has been the practice for a girl to be promised to an older man who might have one or more wives at the time he married the girl. An older wife was supposed to help the young wife not to feel nervous and to teach her wifely duties. Young girls are still sometimes given to older men. A few years ago an old man who already had two aged and feeble wives had a third young wife promised to him. When her school days were over she moved in with the old folk to care for them.

Another teen-aged girl was given to a middle-aged man of standing in the group. He had been married previously and his children were grown up. The girl was unhappy about the situation and ran away more than once. The older man decided he would renounce his right to the girl and he now has a middle-aged wife. The girl then married a young man who was not straight for her.

3.3 POLYGAMY

Polygamy is not uncommon. A man may have two wives, and in one

case I have heard of three. These are recognised among the Aboriginal community as valid unions.

There is no polyandry as such. But, as has already been stated, a man may give permission for his wife to have a boyfriend. On the other hand a woman may have a *yarungu* 'secret lover'. These secret alliances cause disapproval. People who engage in such alliances are regarded as trouble makers.

4. KINSHIP BEHAVIOUR

A person's interaction with others may be marked by varying degrees of restraint or familiarity. The relationship where the greatest restraint is observed is between a woman and her son-in-law, the *marruku* relationship. They are expected to avoid being in close proximity with each other. A man avoids not only his actual mother-in-law but any woman who is classified as such. The reason for this avoidance is that a woman who is *marruku* has the potential of producing a wife for him.

In the past if a woman and her son-in-law saw each other they would pass at a distance and not address each other. These days not everyone takes the matter seriously. Occasionally a woman and her actual son-in-law will live in the same family group. But this is not the usual practice and most men are still cautious about going near a *marruku*. However a woman will not bother to avoid a *marruku* if he is only a small child, and indeed will often play with him.

If a man from the section into which a woman's daughter should marry is too close for marriage there is no need for such strict avoidance. Instead of calling each other *marruku* they use the term *walka-walka*.

A man and his wife are expected to behave in a restrained fashion towards one another in public, without any joking. The same applies to any two persons who are in correct relationship for marriage.

In some cases where a man and woman would normally be expected to be in right relationship for marriage, for some reason imperfectly understood they choose to regard themselves as more like brother and sister and not free to marry. I think the reason for this choice may be that it gives greater freedom. In this relationship the two may freely talk and joke together. Their term for each other is *jaluwal*.

A woman is supposed to be stern with her daughter. On the other hand, grandparents and grandchildren can be relaxed in each other's company.

5. CONCLUSION

It seems probable that in the years since European settlement of the Pilbara there has been relaxation with regard to avoidance relationships and correct marriages. However, it is hard to make objective judgments on how much attitudes have changed, especially toward marriage, since we do not know the frequency of wrong marriages before settlement. It is evident that not everyone views wrong marriages lightly these days.

Not all the Nyangumarta live in the same sort of environment. Some live in a mission station situation at La Grange. At the other end of the scale, a large proportion live in a much more traditional society at Strelley. Then there are other groups whose relationships with Europeans are more relaxed than those of the Strelley Community. A few Nyangumarta people have even ventured to live in Housing Commission dwellings in Port Hedland or South Hedland. But I have not been able to discern that these different environments have made a great deal of difference in attitudes toward kinship ties. Even those who have moved out into the wider community keep in close contact with other Aboriginal groups and regard kinship ties as important.

Kinship ties go far beyond the bounds of those who regard themselves as Nyangumarta. There is a great deal of inter-marriage between language groups. People seem to adjust with very little mental effort to the differences in section organisation of the Yindjibarndi to the west and the Garadjari to the north-east.

It seems to me that social organisation as described in this paper still has a very pervasive influence in the life of the Nyangumarta people.

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Work Papers of SIL-AAB
Series B Volume 8
December 1982

A DESCRIPTION OF THE MATHEMATICAL CONCEPTS OF GROOTE EYLANDT ABORIGINES

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0. INTRODUCTION

This paper is the result of a number of years experience in education and linguistics on Groote Eylandt. During my teaching years, from 1952 to 1966, I became aware of the tremendous problems facing Aboriginal pupils as they struggled with concepts foreign to their culture, particularly in areas such as mathematics. From 1967 on, while engaged in linguistic studies, I have found many of those problems highlighted or explained.

In this paper I have attempted to outline some of the concepts relating to Aboriginal world view in order to help overcome the difficulties in teaching mathematics and related subjects. Much more detail could be included which would be relevant to those actually involved in teaching Groote Eylandt children; however it is hoped that this paper will also be useful to teachers in other Aboriginal schools.

The Anindilyakwa examples are set out on the left hand pages to enable people to read this material quickly. References to these numbered examples are given by raised numbers in the text on the right hand pages. The examples themselves have been simplified in terms of morpheme analysis to make them more readable to non-linguists, and technical terms have been reduced to a minimum. In many examples, the pronouns in their free form which would normally occur but which are not needed to make sense have not been included for the sake of brevity. For instance in example 32 *kilawurradinama* actually means both 'I will return' and 'you will return'. It

should also be noted that the suffix *-ma ~ -murra* (statement of fact) normally occurs when sentences are removed from context and this has not always been added — again, for brevity's sake. This means that examples in this paper may need to be expanded for use in conversation. (For more information on Anindilyakwa phonology see Stokes 1981.)

Groote Eylandt is situated in the west of the Gulf of Carpentaria. There are about 900 Groote Eylandters living in two communities: at Angurugu and at Umbakumba. Anindilyakwa is the language spoken in both places. I have had a close association with Aborigines in various situations ranging from the more formal teaching and learning situations to the less formal day to day contact in the settled community of Angurugu and camping out in traditional Aboriginal life-style. Many of the examples in this paper have come directly from conversations heard and observations made during these experiences.

It must be realised that the way Aborigines see things is often very different from the way non-Aborigines see them. Two groups of people, with very different backgrounds, life-styles and needs, focus on different aspects of the same phenomenon. All groups of people have basic concepts on which to build. Their ideas develop differently along different lines, having different patterns according to those things they recognise as important. When a technological society, which depends heavily on literacy and numeracy skills, intrudes on a non-literate society, adaptation must take place, together with adoption of new ideas. The Western-educated person is inclined to focus attention on those areas of the school for which the Aboriginal language seems inadequate. This is often because the Aboriginal and Western cultures are so different that it is neither appropriate nor possible to take the Western syllabus as it is and seek to translate it from English into the Aboriginal language. When the Westerner discards his own world view and looks through Aboriginal eyes he learns to appreciate the fact that there is indeed a considerable basis of knowledge on which to build. However, the traditional order in which concept development takes place in Aboriginal society does not follow the traditional Western order.

This paper attempts to highlight and explain many of the more important differences between Aboriginal and Western thought with particular reference to those concepts most frequently encountered in school. It is hoped that it will assist curriculum developers in drawing from realistic situations for mathematical and related examples.

1 *wurr-abiyakarbiya war-nungkwarba nabuki-likenuma angerriba*
plural-three plural-man they.three-went over.there

'Three men went over there.'

ningi-lirraki-rringka alakina-k-ya jurra ambilyuma-kiya
I-two-saw those.two-two book two-two

'I saw those two books.'

2

nenungkwarba	man (masculine singular)
didarringka / *duwalya*	woman (feminine singular) plus curlew ~ curlews (non-human it *d* sing ~ plur)
wunenungkwarba	two men (masculine dual)
wurringidarringka	two women (feminine dual)
wurrubukenungkwarba / *wurrubukidarringka*	three men (masculine trial) / three women (feminine trial)
warnungkwarba / *wurridarringka* / *wurruwarda*	men (masculine plural) / women (feminine plural) / dog ~ dogs (non-human it *w* sing ~ plur)
yiburada	wallaby ~ wallabies (non-human it *y* sing ~ plur)
malamukwa	canoe ~ canoes (non-human it *m* sing ~ plur)
akwalya	fish (non-human it *a* sing ~ plur)

N.B. 1. Brackets enclose members of the same noun class; italicised letters indicate particular Anindilyakwa noun classes, e.g. the *d* noun class.

2. The noun class form *wurrubuk-* 'trial human nouns' is not used as commonly as the dual and plural forms. It is more common to include trial nouns in the sixth noun class with masculine ~ feminine plural nouns.

1. PURE NUMBER

Groote Eylandters distinguish carefully between small numbers, especially with reference to people. The consciousness of differences between small numbers is reflected in the language by being firmly embedded in the grammar. There was no need to distinguish between large numbers before the advent of modern technology.

In English we think of either one thing (singular) or more than one thing (plural), i.e. there are two categories. In Anindilyakwa the classification is more complex. There are four possible categories:

singular	-	one
dual	-	two
trial	-	three
plural	-	more than three

In practice the trial form can include four.

Ambiguity is avoided by reference to number in the verb, the subject, the object, the adjective and the demonstrative, where these occur in any given sentence.[1]

There are nine noun classes, each normally distinguished by its initial letter or syllable, e.g. *n-* and *wun-*.[2] Number is not indicated in the noun for non-humans, but where necessary it can be shown in various ways which are different from English. For humans, number is indicated in the nouns as well as by numeral adjectives (see section 1.1.2. Numerals).

[3] Anindilyakwa Number Names

nara ebina	none
awilyaba	one
ambilyuma ~ ambambuwa	two
abiyakarbiya	three
abiyarbuwa	four
amangbala	five
ememberrkwa	ten
amaburrkwakbala	fifteen
wurrakiriyabulangwa	twenty (invariable - i.e. does not change its form in different grammatical contexts)

N.B. 1. The word *ambambuwa* 'two' which is cited as an alternative by Worsley (1954:36) is still used, in the restricted sense of 'two only'.

2. Worsley found that there was confusion in the usage of the number names for fifteen and twenty; he concluded that *wurrakiriyabulangwa* is the term for fifteen. Without denying that some people are confused in using the terms, I believe my data clearly indicates that the invariable form *wurrakiriyabulangwa* is 'twenty'. As recently as May 1982 a 74 year old woman was still able to count in fives without hesitation; she counted with the tips of her fingers as indicated in section 1.1.3 and used the number names as outlined above.

[4] Macassan Number Names

si ~ sibe're ~ se're	one
ruwa	two
tallu	three
appa'	four
lima	five
sampulo	ten
sampulo allima	fifteen
ruwampulo	twenty

(Macassarese numbers 6-9 are different morphemes and not compounds as in Anindilyakwa.)

1.1 CARDINAL NUMBER

A technical economy requires a complicated number system in abstract terms. In Western society many people are fascinated with rote counting from early childhood. When mothers teach their children to count, they very soon pass from the counting of concrete objects to abstract counting far beyond the child's experience.

In traditional Aboriginal society nothing used to be counted that was outside normal everyday experience. When asked for what purpose counting was used in the old days, the old women who know the number names say that counting was used for turtle eggs. There is a story on Groote Eylandt about a mythical dog that could count. The story tells how the dog went hunting and returned to his family with the turtle eggs he had found. He began counting them in order to share them (though the story reveals that the dog cheated by hiding some eggs, causing a fight to develop!).

The number system in Anindilyakwa[3] is more developed than in most other Aboriginal languages. Dr Peter Worsley, an anthropologist who was on Groote Eylandt, suggested that contact with the Macassans accounted for the development of number names beyond five, as it is normal in Aboriginal languages to count either to three or to five (Worsley 1954:368, Harris 1980:13). However, in conversations with Old Charlie, while he agreed with me that various names of introduced objects have Macassan origin, he did not consider that the number names originated in the Macassan language.* Macassan number names supplied by Dr C. Macknight (pers. comm.) are listed opposite.[4]

Since the introduction of English, English words have been used almost exclusively for numbers above five, while both the Anindilyakwa and English words have been used for the numbers up to five and also for ten. Today few young people know of the existence of the old Anindilyakwa words for fifteen and twenty. It is probably some time since these words were in use, but they are still remembered by middle-aged and old people, even though they do not always remember which word comes first. The old woman who told me the story of the mythical dog and the turtle eggs used the old words for fifteen and twenty as she described the dog counting.

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* Charlie Galiyawa Wurramarrba, born about 1890, died in 1978. He remembered the days of the Macassan traders from the Celebes who came in search of trepang and pearl shell until about 1906, after the White Australia Policy was enforced. Old Charlie's father went away with the Macassans on their boat for about two years. His reminiscences are recorded on tape and are published in Cole 1972:31-2.

5	*nuwilyaba nenungkwarba*	one man
	wunambilyuma wunenungkwarba	two men
	wurrabiyakarbiya wurrubukenungkwarba	three men
	wurrabiyarbuwa warnungkwarba	four men
	wurrumangbala warnungkwarba	five men
	wurrumemberrkwa warnungkwarba	ten men
	wurramaburrkwakbala warnungkwarba ~ wurrumemberrkwa wurrumangbala warnungkwarba	fifteen men
	duwilyaba didarringka	one woman
	wurringambilyuma wurringidarringka	two women
	wurrabiyakarbiya wurrubukidarringka	three women
	wurrabiyarbuwa wurridarringka	four women
	wurrumangbala wurridarringka	five women
	wurrumemberrkwa wurridarringka	ten women
	wurramaburrkwakbala wurridarringka ~ wurrememberrkwa wurrumangbala wurridarringka	fifteen women
	yaraja	goanna ~ goannas
	yuwilyaba yaraja	one goanna
	yambilyuma yaraja	two goannas
	yabiyakarbiya yaraja	three goannas
	yabiyarbuwa yaraja	four goannas
	yimangbala yaraja	five goannas
	yimemberrkwa yaraja	ten goannas
	yamaburrkwakbala yaraja ~ yimemberrkwa yimangbala yaraja	fifteen goannas
6	*amangbala awilyaba*	6
	amangbala ambilyuma	7
	amangbala abiyakarbiya	8
	amangbala abiyarbuwa	9
	ememberrkwa awilyaba	11
	amaburrkwakbala awilyaba	16
	wurrakiriyabulangwa awilyaba	21
	wurrakiriyabulangwa amangbala awilyaba	26

1.1.2 NUMERALS

Numerals in Anindilyakwa are adjectival. They are complicated by the number of noun classes, because all adjectives must agree with the nouns they qualify. Taking nouns of three of the classes: *akwalya* 'fish', *malamukwa* 'canoe', *yaraja* 'goanna', and qualifying them with the numeral *awilyaba* 'one', gives *awilyaba akwalya; mawilyaba malamukwa; yuwilyaba yaraja.*

The numeral adjective *awilyaba* 'one' is used in Anindilyakwa more often than in English, sometimes being used in contexts where an English speaker would use the indefinite article 'a'. The numeral adjective *ambilyuma* 'two' is used for dual, *abiyakarbiya* 'three' for trial and *abiyarbuwa* for 'four', and so on for plural nouns. These adjectives occur with both human and non-human nouns and agree with the nouns they qualify.[5] Some young people today use the compounds *ememberrkwa amangbala* 'ten five' and *ememberrkwa ememberrkwa* 'ten ten' as alternatives for fifteen and twenty.

1.1.3 COUNTING

The number names are basically 1, 2, 3, 4, 5, 10, 15 and 20. Counting after five continues 5+1, 5+2 etc. to ten. Counting after ten continues 10+1, 10+2 etc. to fifteen and counting after fifteen continues 15+1, 15+2 etc. to twenty. By using 20+1 for twenty-one and 20+5+1 for twenty-six and so on, it was possible to progress to twenty-nine, but this has not been common practice.[6]

An old woman counting pebbles for me on the beach clearly demonstrated the method of counting in fives. First she counted 1, 2, 3, 4, 5. Then instead of the cumbersome 5+1, 5+2 etc. for 6, 7, etc., she counted again 1, 2, 3, 4, and jumped to 10, then again 1, 2, 3, 4, and jumped to 15, and finally 1, 2, 3, 4, and jumped to 20, as she pushed aside the separate heaps of pebbles already counted. This was in effect the beginning of abstract counting, as she held in her head the number of heaps of pebbles.

Another example of counting by a non-literate woman threw further light on the procedure. Before counting the pebbles she gathered them up into one heap. This immediately brought to mind an indefinite number of turtle eggs ready to be distributed. Counting was probably used for sharing things more often than for adding them together.

7	*awilyaba amamuwa ayarrka*	one finger
	awilyaba amamuwa alika	one toe
6	*nara nibina nenungkwarba*	no man
	nara dibina didarringka	no woman
	nara dibina duwalya	no curlew
	nara wunibina wunenungkwarba	no two men
	nara wurringibina wurringidarringka	no two women
	nara wurribina warnungkwarba	no men
	nara yibina yiburada	no wallabies
	nara mibina malamukwa	no canoes
	nara ebina akwalya	no fish

These Anindilyakwa phrases mean that no man etc. is (was ~ will be) here (there) according to the context.

I have observed old people using fingers and toes for counting in recent times. The Anindilyakwa words for fingers and toes are in the *a* noun class.[7] The procedure for counting on fingers and toes is as follows:

> The hand is held loosely with the palm facing the person counting. The fingers are placed together one by one; index finger to thumb, middle finger to thumb, ring finger to thumb and little finger to thumb, until all fingers are bunched together. If the number is more than five the fingers are held together while counting continues with the other hand. After ten, the toes are touched one by one, first on one foot and then on the other.

1.1.4 ZERO AND INFINITY

'Nothing' is expressed by ***nara ebina*** 'not any'. This construction is made from ***nara*** 'not' and the demonstrative adjective ***ebina*** 'that (same)'.[8] There is no concept of 'zero' as a place marker within the Anindilyakwa number system because there are no number symbols in Anindilyakwa.

There is no term for 'infinity' as such, but the concept 'innumerable' can be expressed by a verb in Anindilyakwa: ***yinguwurramur.dinama dakwulyingarrijanga*** 'there are too many stars to count'.

9	*yukwala yaraja*	some goannas
	yambawura yaraja	few goannas
	yababurna ~ yangkwulyumuda yaraja	many goannas
	yababurni-langwa ~ yangkwulyumudi-langwa yaraja	all the goannas
	nara engkarrnguma akwala eka not cut some tree	
	'Don't cut any more trees.'	
10	*ayukwujiya akungwa*	a little water
11	*aruma aninga*	plenty of food, or a big amount of one kind, e.g. sugar
	ababurna aninga	many kinds of food, or many packets of one kind
	aruma akungwa	a lot of water
	ababurna akungwa	many pools of water
	aruma angwarra	a lot of smoke
	ababurna angwarra	smoke from a number of fires
	aruma angwura	a big fire; a big load of pieces of firewood
	ababurna angwura	many fires
	yaruma yalyukwa	a lot of rain
	yababurna yalyukwa	many rain clouds
12	*ambarrngarna akwalya?*	how many fish?
	ambarrngarna awarnda?	how many stones? ~ how much money?
	ambarrngarna amalyirra?	how much petrol? i.e. how many litres?
	dambarrngarna dumamawura?	what is the time? (literally 'how many clock?')

When the English question 'How many brothers and sisters have you?' is translated into Anindilyakwa, 'how many?' takes a plural prefix, but *nawena* 'your brother' and *diyabena* 'your sister' do not take a plural suffix.

1.1.5 COUNTABLE AND UNCOUNTABLE NOUNS

In Anindilyakwa, as in English, there is a distinction between countable and uncountable nouns, although the distinction is organised differently in Anindilyakwa. Quantitative adjectives 'few' and 'many', 'much' and 'little' agree with the nouns they qualify and occur with human and non-human nouns. The adjectives *akwala* 'some', *ambawura* 'few', *ababurna ~ angkwulyumuda* 'many' and *ababurni-langwa ~ angkwulyumudi-langwa* 'all' are generally used with countable nouns,[9] while *ayukwujiya* 'little'[10] and *aruma ~ adirrungwarna* 'much' are generally used with uncountable nouns.

It is possible for both *ababurna ~ angkwulyumuda* 'many' and *aruma ~ adirrungwarna* 'much' to be used with certain nouns giving them a slightly different meaning.[11] The choice of word depends on where the focus lies, in either a countable or uncountable context, e.g. *maruma ŋamudangkwa* 'much sand' and *mababurna mamudangkwa* 'many sand-hills'. However these distinctions are not always made.

The adjective *ambarrngarna* 'how many?' refers to countable nouns and can only occur with uncountable nouns in certain situations, as in the examples.[12] When a person buys petrol the question *ambarrngarna amalyirra?* is quite acceptable, because the cost of petrol is standardised and the intended meaning is 'how many litres?' (The English alternative for 'how much?' with reference to something being poured into a container is often 'Tell me when to stop'. The Anindilyakwa translation for this request is *yikungwanjajiya* 'You will make me stop'.)

In some situations the adjective *amiyembena?* 'what kind?' can be used to ask 'how much?'. In this case a further question 'a little or a lot?' makes it clear that quantity is under discussion. When material is being discussed *dambarrngarna dumbala?* can only mean 'How many pieces of material?' but the question *dumiyembena dumbala, daruma yinda diyukwujiya?* 'What kind of material, big or small?' is the way to ask 'how much?'. The approximate amount can be indicated by hand gestures. At the Angurugu shop the women usually choose a ready cut length of material for a child's dress and a standard three metres for an adult's dress. Men buying material for ceremonial purposes usually take the roll of material they have chosen and ask for ten or twenty dollars worth, or else demonstrate the required amount. One old man pointed to a garbage bin outside the shop to indicate the length of the material he wanted to buy.

wurr-ambarrngarna n-aw-enu-murriya
plur-how.many masc.sing-older.brother-your.sing-plur

'How many brothers have you?'

Answers may include:

wun-ambilyuma n-aw-arrka-kiya
masc.dual-two masc.sing-older.brother-my-two

'I have two older brothers.'

wurr-abiyakarbiya n-enikumarnj-arrku-murriya
plur-three masc.sing-younger.brother-my-plur

'I have three younger brothers.'

13 *arngkambarrngarna bungaja?* how many times did they hit you?

14

yinuwa	we (dual masculine exclusive)
yirringuwa	we (dual feminine exclusive)
yirrubukwurruwa	we (trial exclusive)
yirruwa	we (plural exclusive)
nungkuwa	you (singular)
nungkwunuwa ~ nungkwurnuwa	you (dual masculine)
nungkwurringuwa	you (dual feminine)
nungkwurrubukwurruwa	you (trial)
nungkwurruwa	you (plural)

When the prefix *arngk-* 'times' is added to *ambarrngarna* 'how many?', it makes an adverb 'how many times?'. [13]

Frequently questions such as 'How much rain was there?' and 'How much money have you?' are asked differently in Anindilyakwa, being the equivalent of 'Was there a lot of rain?' and 'Have you a lot of money?'. In such cases question intonation can be added to the examples in 11.

1.1.6 PRONOMINAL PREFIXES

The need to be specific with regard to small numbers has resulted in a complex pronominal system which includes a total of twenty-three pronouns. Dual masculine, dual feminine, and trial number are specified in the pronouns denoting 'we (inclusive)', 'we (exclusive)', [14] 'you' [14] and 'they', and are underlined in the examples.

15

yin-aruma	we (dual masculine exclusive) are big
yirring-aruma	we (dual feminine exclusive) are big
yirrubuk-aruma	we (trial exclusive) are big
yirr-aruma	we (plural exclusive) are big
ningk-aruma	you (singular) are big
kin-aruma	you (dual masculine) are big
kirring-aruma	you (dual feminine) are big
kirrubuk-aruma	you (trial) are big
kirr-aruma	you (plural) are big

16

yin-ambilyuma	we (dual masculine exclusive) two
yirring-ambilyuma	we (dual feminine exclusive) two
yirr-abiyakarbiya	we (plural exclusive) three
kin-ambilyuma	you (dual masculine) two
kirring-ambilyuma	you (dual feminine) two
kirr-abiyakarbiya	you (plural) three

17

yini-likajama	we (dual masculine exclusive) are going
yirringi-likajama	we (dual feminine exclusive) are going
yirrubuki-likajama	we (trial) are going
yirri-likajama	we (plural) are going
ningki-likajama	you (singular) are going
kini-likajama	you (dual masculine) are going
kirringi-likajama	you (dual feminine) are going
kirrubuki-likajama	you (trial) are going
kirri-likajama	you (plural) are going

Pronominal prefixes derived from the pronouns are added to all descriptive[15] and numeral[16] adjectives. The distinction between small numbers is more important to Anindilyakwa speakers for human beings than for non-humans. However the distinction between the sexes is equally important. Therefore in the prefixation for human beings both number and sex are in focus. For non-human nouns the distinction between small numbers is not indicated in the prefixation of descriptive and numeral adjectives, but can be shown in demonstrative adjectives (see section 1.1.7). Although it is beyond the scope of this paper, it should be noted that dogs are to some extent aligned with human beings rather than with animals in the system of prefixation.

The same attention to small numbers is evident in the pronominal prefixes added to verb stems. For intransitive verbs in the present and past tenses,[17] many prefixes are identical to those used in prefixing adjectives. In the subject prefixes of transitive verbs, the distinction between small numbers does not extend throughout the whole system.

18

akina (akwalya)	that (fish) ... it
alakina (akwalya)	those (two fish) ... they
abukalakina (akwalya)	those (three fish) ... they
awurrakakina ~ amurndakakina (akwalya)	those (fish) ... they
nakina (nenungkwarba)	that (man) ... he
wunalakina (wunenungkwarba)	those (two men) ... they
wurrubukalakina (wurrubukenungkwarba)	those (three men) ... they
wurrakina ~ wurrumurndakakina (warnungkwarba)	those (men) ... they
dakina (didarringka)	that (woman) ... she
wurringalakina (wurringidarringka)	those (two women) ... they
wurrubukalakina (wurrubukidarringka)	those (three women) ... they
wurrakina ~ wurrumurndakakina (wurridarringka)	those (women) ... they

19

yakina yimuwarraka ngarningma yakina nilikajama mukumuku-wa
that green.turtle we.know that it.goes deep.sea-to

'We know the green turtle. It goes to the deep sea.'

nalikenuma wurrakina mijiyelyu-wa
they.went they beach-to

'They went to the beach.'

20

ningkakina	you (singular that)
kinalakina	you (dual masculine those)
kirringalakina	you (dual feminine those)
kirrubukalakina	you (trial those)
kirrakina	you (plural those)

21

yaruma yaraja	a big goanna
yarumuruma yaraja	big goannas
wurrarumuruma warniniyarringka	the important old men

1.1.7 DEMONSTRATIVES

Demonstrative adjectives occur with human and non-human nouns, agreeing with the nouns they qualify. Distinction is made between singular, dual, trial and plural number in all noun classes.[18]

The basic demonstratives are *enena* 'this', *akina* 'that', *angaba* 'that (over there — Old English yon ~ yonder)' and *ebina* 'that (same)'. *Akina* 'that' occurs more frequently in Anindilyakwa discourse than in English. It is often used where the definite article 'the' is used in English and also as a demonstrative pronoun.[19] Demonstrative pronouns are also used extensively in conversation.[20]

1.1.8 OTHER NUMBER DEVICES

a) Reduplication

Partial reduplication, indicated by underlining in the examples, occurs to show plurality in all adjectives qualifying human and non-human nouns.[21] When a noun is qualified by two or more descriptive adjectives, reduplication does not necessarily occur on each one if this would prove cumbersome. Reduplication occurs in certain nouns, e.g. *wurrangaringariya* 'babies'. Such words are semantically nominal but grammatically adjectival.

22 ***kini-lirraki-likarna*** you (dual masculine) went

kirringi-lirraki-likarna you (dual feminine) went

23 Intransitive verb indicating duality of subject:

wun-ambilyuma wun-enungkwarba neni-lirraki-likenuma *angerriba*
two.masc-two two.masc-man they.dual.masc-two-went over.there

'The two men went over there.'

yambilyuma yaraja ni-lirraki-likenuma *angerriba*
two goanna it.*y*-two-went over.there

'The two goannas went over there.'

24 Transitive verb indicating duality of object:

nenuma-lirraki-rringka ***wurrakina*** ***mambilyuma*** *mijiyanga*
they.dual.masc.it.*m*-two-saw they two boat

'They saw two boats.'

25 Intransitive verb indicating plurality of subject:

(warnumamalya) na-murndaki-likarna ~
na-wurraki-likarna they all went (people)

(yaraja) nu-murndaki-likarna they all went (goannas)

(duwalya) yingu-murndaki-likarna they all went (curlews)

26 Transitive verb indicating plurality of object:

wunalakina-kiya ***narra-murndaki-rringka*** ***wurrababurna*** ***wurruwarda***
those.two.masc-two they.them-all-saw many dog

'Those two men saw a lot of dogs.'

27 ***wunambilyuma wunenungkwarba-kiya*** ~ two men
wunambilyuma-kiya wunenungkwarba-kiya

ambilyuma alakba-kiya two legs

maruma-kiya malamukwa two big canoes

wurriyukwujiya-kiya two little children

b) Prefixes

Dual prefix *-lirrak-*

An optional dual prefix *-lirrak-* may be added between the obligatory dual pronoun prefix and the verb stem.[22] When this prefix occurs in an intransitive verb it indicates duality of the subject.[23] When it occurs in a transitive verb it refers to the object.[24]

Plural prefix *-murndak-* ~ *-wurrak-*

An optional plural prefix *-murndak-* ~ *-wurrak-* may be added between the obligatory plural pronoun prefix and the verb stem.[25,26] This prefix acts in the same way as the dual prefix.

Although the dual and plural object prefixes can co-occur with the dual subject prefixes,[24] they cannot co-occur with the trial subject prefix.

The following examples show some further uses of the plural prefixes. The prefix *-murndak-* occurs in the idiomatic expression *numurndakayuwaya* 'he is (all) weak'. It also occurs in the noun *amurndakijika* 'things, thing'. The introduction of a multitude of material things bearing English names, and the frequent use of 'thing' in English may be reasons for the use of *amurndakijika* in the singular today.

The prefix *-wurra(k)-* occurs in the adjective *awurra-kawura* 'together' (see section 1.2.3).

Although the quantitative adjectives already show plurality, a plural prefix may be added to some of them, e.g. *awurrak-ababurna* ~ *awurra-kwulyumuda* 'very many'.

c) Suffixes

Dual suffix *-kiya* 'two'

The dual suffix *-kiya* 'two' occurs on nouns and descriptive adjectives. It can also be added to the numeral adjective 'two'[27] but not to the free forms of dual pronouns.

Plural suffix *-wiya*

The plural suffix *-wiya* added to nouns and descriptive adjectives expresses an indefinite number larger than two. This suffix often has the meaning of 'all' or 'only' in English. *Warnungkwarba-wiya* 'men' indicates that the people referred to are males, to the exclusion of females, i.e. only males. *Duwalyu-wiya* 'curlews' means that the birds are all curlews. *Akwalya arumuruma-wiya* 'big fish'

28 *angubina-wiya* — cloudy

amarda-wiya — grassy

amilyumilyinju-wiya — muddy

29 *akangkirrayina angwurra* — we will run fast

nalyalyimbukwayinuma — they conversed

namungkwulijayinuma — they all slept together

30 *nenirringkayinama* — they (the two men) are looking at each other

nenuwardiyinama — they (the two men) are fighting each other

31 *awilyaba akwalya ayukwujiya* — one little fish

ambilyuma akwalya ayukwujiya — two little fishes

abiyakarbiya akwalya ayukwayuwa — three little fishes

abiyarbuwa akwalya ayukwayuwa etc. — four little fishes

infers that all the fish are big. If there are small ones as well, then *arumuruma-wiya* translates 'the big ones'. When we say that *mangkarrkba* 'wild plums' are *muruku-wiya* it may mean that they are all unripe or it may just refer to the unripe ones amongst others.

The suffix *-wiya* may be added to uncountable nouns.[28] In this case it is usually translated in English by a noun and 'y', e.g. *arrirru-wiya* 'windy'. However it must not be presumed that an Anindilyakwa noun + *wiya* necessarily has the same meaning as an equivalent English noun + y. Thus 'dirt' can be translated as *ajiringka,* but 'dirty' is not always *ajiringka-wiya*. In this case Anindilyakwa is more specific than English. A dirty plate may be *aninga-wiya* 'having food on it' or *amalyirra-wiya* 'sticky (having juice on it)'. The plate is only *ajiringka-wiya* if it has been on the ground and literally has earth and dust on it.

First order suffixes *-ay-* and *-iy-*

A suffix of the first order, i.e. a suffix immediately following the verb root, viz. *-ay-* or *-iy-*, occurs on certain verbs marking various aspects of plurality. It is underlined in the examples opposite. In intransitive verbs the suffix expresses togetherness of the action.[29] In verbs which normally require transitive prefixation the suffix expresses reciprocity. In this case it should be noted that the intransitive set of prefixes is used.[30]

Past tense suffixes

In certain common verbs there are two past tense suffixes, one for the singular and one for the plural subject, e.g. *yingangkarra* 'she ran away' but *nuwangkirraja* 'they ran away'.

d) The adjective *ayukwujiya* 'little'

The singular ~ dual adjective *ayukwujiya* 'one ~ two little' has a plural form *ayukwayuwa*. The plural form is used for any number bigger than two.[31]

32 *likaja dirrbura ememberrku-wa alikira*
go straight ten-to house

'Go straight to the tenth house.'

yabiyakarbiyu-manja yimawura
three-in month

'In three months time' or 'in the third month'

naru-wiya ambilyuma durdurla arduma kilawurradinama ngayuwa
not-while two bell not.call I.will.return I

'I'll come back before the second bell.'

kengkirraju-manja ambilyuma durdurla kamba kilawurradinama
I.will.hear-when two bell then I.will.return

'When I hear the second bell I'll come back.'

kengkirraja-mu-langwa ngayuwa ambilyuma durdurla kamba
I.will.hear-statement.of.fact-after I two bell then

kilawurradinama
I.will.return

'I'll come back after the second bell.'

arngk-umangbala ningiridanguma eka kamba bangkilya nengkarrnga
times-five I.chopped tree then tomahawk it.broke

'I chopped the tree five times and then (the sixth time) the tomahawk broke.'

mabiyakarbiyu-manja marringa (arngk-abiyakarbiya-ma) ningilikarnuma
three-on night times-three-emphasis I.went

awuruku-wa kembirra ningingarringka dingarrbiya
billabong-to then I.saw.it.d crocodile

'On the third night (the third time) that I went to the billabong I saw a crocodile.'

33 *andiya ngarningka akwiyadenu-wa ~ amukwiyadenu-wa*
look.for again this.kind-to

'Look for more of this kind.'

34 *akwiyadena eningaba umba akwiyadakina ~ akwiyadangaba awurrariya*
this.kind good but that.kind ~ that(over there).kind bad
'This kind is good, but that kind is not.'

1.2 MANIPULATION OF NUMBERS

1.2.1 ORDINAL NUMBER

There are no special terms for ordinal number in Anindilyakwa. The distinction between cardinal and ordinal number is not focused upon in the same way as in Western society. The same terms are used for both cardinal and ordinal number. The meaning is clear from the context in which the numeral is used.[32] Note the adverbial expression using the prefix *arngk-* 'times' in the last two examples.

1.2.2 SORTING

A great deal of sorting occurs in a traditional Aboriginal community. Although the categories into which a child has learnt to sort things may differ from those categories the school emphasizes, the actual skill of sorting is not new to the beginning school child.

One aspect of sorting involves like and unlike attributes. When a mother teaches her child which berries are edible and which are not, she points out an example and tells her child to pick some berries like it.[33] During the process of picking berries, sorting takes place as a person chooses the biggest berries on a bush. Further sorting automatically takes place after collecting is finished. Anyone eating a handful of berries chooses the best and discards the least ripe, the over-ripe, the stunted and diseased that were unnoticed at first. In this way a more precise sorting follows the initial rough sorting.[34]

When someone is making string, the strips of fibre that have been collected must be sorted into the right lengths. While the strips are being gradually inserted into the string, any unsuitable strips are discarded. Thick and thin pieces are selected from the pile of strips according to the thickness of the partially made string. In this way the complete string should be the same thickness throughout, although it is composed of strands of varying thickness. It may be noticed that this type of sorting entails choosing complementary attributes instead of like attributes, to achieve uniformity in the finished product.

35 *eningaba-wiya ~ eninginingaba-wiya* the good ones

akwalya ayukwayuwa-wiya the small fish

mulbulirra miyarrmiyarrma-wiya the thin strips of fibre

36 *nalikena wurruwurrakawura* they went together

nilikena nakwukawura he went alone, by himself

nalikena wurrayabijaba they went separately

wakuma eka ayabijaba put the sticks down separately

37 *kirrambambilyuma-wiya* all of you, two by two

kirruwilyuwilyaba-wiya all of you, one at a time

wurringuwilyuwilyaba-wiya two girls, one by one

awilyuwilyaba-wiya one each, e.g. fish, one by one

na-likarna wurr-ambambilyuma-wiya
they-went plur-two.two-plur

'They went two by two.'

38 *arngk-ambarrngarna ningki-likarnuma Darwin-langwa*
times-how.many you-went Darwin-from

'How many times have you been to Darwin?'

Typical answers are:

arngk-abiyakarbiya three times

arngk-ababurna many times

The suffix *-wiya* (see section 1.1.8) is used when sorting.[35]

1.2.3 GROUPING

There are various ways of expressing the concepts of togetherness and separateness. The basic terms are *awurrakawura* 'together', *akwukawura* 'alone' and *ayabijaba* 'separate'.[36] (See also the suffixes *-ay-* and *-iyi-* in section 1.1.8.)

a) Addition and multiplication

Before Western education was introduced it is probable that sharing, and therefore the process of division, was more common than the processes of addition and multiplication.

Adding took place with small numbers in concrete situations. It was closely connected with counting, which in fact makes use of the process of addition in most numbers over five (see section 1.1.3). For instance, several men might count their spears before fighting to ascertain the total. Each man would presumably have a different number, so it would not be possible to take the short cut of multiplication to obtain the total number.

When several canoes set sail, the number of people accommodated by each canoe depended on the size of the canoe and the proportion of adults to children. The possibility of four canoes setting sail each containing the same number of people with their possessions sounds more like a hypothetical, abstract proposition than a real life situation. Such hypothetical examples are just as unlikely today, and this should be taken into account when devising mathematics curricula.

The possibility of accounting for people and things in small groups of equal numbers, especially pairs, is not precluded. When partial reduplication, indicated by underlining in the examples, occurs in the numeral adjective *ambilyuma* 'two' and the plural suffix *-wiya* is added, the new word means 'two by two, two at a time, two each or by twos'. Other numeral adjectives can be handled in the same way, e.g. 'by ones'.[37] The processes of addition and multiplication are not likely to be involved. However the prefix *arngk-* 'times' is directly associated with multiplication.[38]

b) Division and subtraction

Sharing is one of the first lessons an Aboriginal child learns. The process of division is common for the purpose of sharing. It concerns concrete objects, particularly food, and is not considered in the abstract.

39 *yukwa ekwarra arinja* give me half the orange

mikwarra yukwa nganja give me half of them, e.g. *mangkarrkba* 'wild plums'

ekwarra akungwa half the water

40 *ngay-embirra nguwurdiya*
I-in.turn let.me.climb

'It's my turn to climb.'

41 *nawarrukwayinama* they take turns, e.g. doing shift work

kirringu-warrukwayinuma dirija
you.two.fem-changed. reciprocal dress

'You two (girls) have swapped dresses.'

Sharing means dividing countable objects, such as shellfish and berries, which are often too small to be worth counting, and which can be divided into heaps or handfuls. Larger countable objects, such as fish, turtle eggs and wild apples are either counted or shared in heaps. Sharing also means dividing by cutting, as in the case of a big fish, a turtle or a wallaby (see example 161). As sharing is usually done within a group of people of different ages and sexes, the division is not usually exact, nor is it precisely calculated in advance.

There are no Anindilyakwa words for the abstract terms 'half' and 'apart'. When objects are divided into two parts, the adjective *ekwarra* 'one part' is used with the appropriate noun meaning one out of two parts. This word is usually used to translate the English word 'half', although in practice it may be only an approximation.[39] It is probably connected with the adjective *akwarrirra ~ akwarra* 'torn' although it can also be used for uncountable nouns (see section 2.9).

Another aspect of sharing is taking turns. The suffix *-embirra* or *-ambulangwa ~ -abulangwa ~ -ababulangwa* is added to the basic pronoun form, producing a series of words such as *ngay-embirra* 'in my turn'.[40] The verb stem *-warru kwayina* has several meanings, including 'taking turns, swapping and sharing'.[41]

The process of subtraction focuses on precise numbers, but when children have sneaked off with some turtle eggs, the abstract exercise of subtraction to discover how many are taken and how many remain is quite irrelevant. When a few fish escape the hunter's spear, he does not contemplate what might have been. Again, when a fish has gone bad it is not 'subtracted' — it is forgotten.

42 *yingalyubarina dakina awank-iyukwujiya aninga umba diyabadikba*
she.ate she rather-little food but her.sister

yingalyubarina ayukwujiya angbilyuwu-baba
she.ate little sickness-because

'She only ate a little but her sister ate even less because she is sick.'

wulkwa mambawura mamamuwa memu-manja beka, umba mangabu-manja
only few marbles this-in bag, but that-in

beka muwank-ambawura makina
bag rather-few it

'There are fewer marbles in this bag than in that one over there.'

mambawura mamamuwa miyukwujiyu-manja beka, umba muwank-ababurna
few marbles little-in bag but rather-many

mangabu-manja
that-in

'There are a few marbles in the little bag, but there are more (quite a lot) in the one over there.'

muwank-ababurna mamamuwa memu-manja beka umba mababurna
rather-many marbles this-in bag but many

angwurra mangabu-manja
more that-in

'There are quite a lot of marbles in this bag, but there are a lot more in the one over there.'

43 *aduwaba nuwardanga ababurna angwala umba yarrungkwa ababurna*
today he.killed many crabs but yesterday many

angwurra nuwardanga nakina
more he.killed he

'He caught a lot of crabs today but yesterday he found even more.'

aruma akungwa enu-manja awurukwa umba aruma angwurra angabu-manja
big water this-in billabong but big more that-in

'There is plenty of water in this billabong, but there is more in that one over there.'

1.2.4 INEQUALITY AND EQUALITY

a) Inequality

The terms 'more than', 'less than' and 'fewer than' are expressed differently in Anindilyakwa and English, as is shown in the examples using the adjectival prefix *awank-* 'rather'. Note the use of *wulkwa* 'only'.[42] 'More than' can also be expressed by the intensifier *angwurra*.[42,43] The most common way of expressing the concept of inequality is from the point of view of the greater quantity.

44 *yaruma yalyukwa nilarrina aduwaba wuburra yarrungkwa*
big rain it.y.fell today like yesterday

'There was as much rain today as yesterday.'

ayukwujiya akungwa enu-manja bajikala wuburra mangabu-manja cup
little water this-in tin that-in cup

'There's only a little water in the tin, the same as in that cup.'

mambawura mema marndekirriyerra enu-manja angalya wuburra angakuba
few this yam this-in place like over.there

'There are as few yams in this place as there are over there.'

45 *alakina-kiya akwalya ayukwujiya-kiya neyenama akina wuburra aruma*
those-two fish little-two they.do that like big

awilyaba-ma akwalyi-da
one-emph fish-emph

'Those two little fish are equal to one big one.'

46 *ebinu-manja angalya* in that place, i.e. the same place already described

nibina nenungkwarba
same man

'that man, i.e. the same man already described'

dibina!
that.same

'That's the one!' (they're talking now about that bird I was telling you about before)

47 *akinu-manja angalya ebinu-manja yingumakburrangarnu-manja*
that-at place same-at she.it.*m*.found-at

yingumadakama marndekirriyerra
she.it.*m*.cooked yam

'She cooked the yams at the place where she found them.'

b) Equality

The concepts 'as much', 'as many as', 'as little as' and 'as few as' are translated using *wuburra* 'like'.[44] *Wuburra* 'like' can also be used to describe items with attributes that are equivalent but not the same, e.g. two small fish that are equal to one large one,[45] but this would not normally be stated so precisely.

c) Identity

ebina 'same'

The English demonstrative 'that' refers to a particular person or thing already mentioned, to avoid ambiguity and to preserve continuity. The adjective *ebina* 'same' has this function in Anindilyakwa.[46]

In sentences containing a main clause and a relative clause, *ebina* 'same' occurs in the relative clause as distinct from *akina* 'that' in the main clause. [47]

48 *alakina* ***bajikala*** *adidirrbura ngawu-da*
those.two tin same still-emph

'Those two tins are just the same.'

49 *wunembirrki-didirrbura-kiya* two men equally stocky

wunilingaki-didirrbura-kiya two men equally tall

yakakwuruma *yi-didirrbura-kiya*
we.two.incl.know we.two.incl-same-two

'You and I both know (the same).'

mababurna manyungwunya nungkwulangwa wuburra ngalilangwa,
many figs your like her

kirringi-didirrbura
you.two.women-same

'You two women both have the same number of figs.'

nenilikena *wuni-didirrbura makinu-manja diraka*
they.two.men.went two.masc-same that-in truck

'They both went together in the same truck.'

50 *yirriyar.danga yirru-wurrakidirrbura*
we.arrived we.all-same

'We all arrived together (at the same time).'

adidirrbura and *awurrakidirrbura* 'same'

The adjective *adidirrbura* 'same' is formed from the adjective *adirrbura* 'straight' by repeating one part (see section 1.1.8 Reduplication). It is used in two ways:

- to describe two or three items which are identical in all respects. 'Just' and 'exactly' reinforce such statements in English, and *ngawa* 'still' and *ngawu-da* 'still' + the emphatic suffix *-da* reinforce similar statements in Anindilyakwa.[48]

- to describe two or three items sharing one or more characteristics. It describes people and things being likened as to size, height, shape, age, colour and so on. People are also likened as to their possessions and to characteristics such as nationality, left- and right- handedness, various abilities and moral qualities.[49] The following phrase may refer to any such comparison according to the context:

wunalakina-kiya	*wuni-didirrbura-kiya*
dual.masc.those-two	dual.masc-same-two

'Those two men are the same.'

In the context of a competition, two contestants or two teams running neck-and-neck or having the same score are described as 'equal' in English and *adidirrbura* in Anindilyakwa.

The plural *awurrakidirrbura*[50] has the same function as *adidirrbura*.

ebinu-murrada ~ *ebinu-murradungwa* 'self-same'

In Anindilyakwa, when one person or thing appear in different circumstances, identity is kept constant by the use of *ebinu-murrada* or *ebinu-murradungwa*. These words occur in a restricted context, such as in the following circumstances:

> In one bark painting several scenes may be depicted to illustrate various parts of one story. One particular man may be represented in each scene together with other figures. To understand the story, it is necessary to ascertain whether the figure in each scene represents that same person or someone different. Having established the identity of the first figure, the rest of the figures are pointed to in turn. The main character whose identity

was first established is referred to in each successive scene as ***nibinu-murrada*** 'the same man'. Any other figures are ***wurruminingka*** 'different'. Similarly, in the consecutive illustrations of a book, people, places and things are identified in this way.

The English word 'same' is very frequently used in the classroom. Typical examples include a teacher asking a child to point to several occurrences of the 'same' word; a child complaining that he has been given the 'same' book that he was reading from on an earlier occasion because he recognises a dirty mark on the page; a child complaining that he is required to re-read the 'same' paragraph that he has already read; a child repeating the 'same' mistake that he has made before. In each case the English word 'same' is translated by ***ebinu-murrada*** ~ ***ebinu-murradungwa*** 'self-same'.

Comparing ***adidirrbura*** with ***ebinu-murrada***

Anindilyakwa differentiates between ***adidirrbura, awurrakidirrbura*** 'same, identical (dual, plural)' and ***ebinu-murrada*** 'self-same (singular)'. This can be illustrated by the following classroom situation:

When books of the one title are handed around a class in school, the children are all said to be reading from the same book ***(awurrakidirrbura)***. The teacher tells them to find the same story, the same page, paragraph, sentence or word ***(awurrakidirrbura)***. The books are all open at the same place, they are ***awurrakidirrbura***.

However, when referring to the page studied the previous day, the Anindilyakwa speaker must use ***ebinu-murrada*** 'self same'. The English speaker can use the one word 'same' in both contexts.

In such situations the Groote Eylandters' concept of 'same' is more carefully defined than the English.

2. APPLIED NUMBER

2.1 ESTIMATION

In a non-literate society with a food-gathering and hunting economy, absolute standards are irrelevant, and people are not accustomed to using descriptive terms out of context.

A technological economy requires absolute standards of weight and measurement. Most people rely heavily on the availability of these measures, and so the skills of estimation are not well developed. Western education forces children to think in abstract terms of measurement at an early age.

In the Aboriginal society, without indigenous arbitrary standards of measurement, the skills of estimating are very well developed. Children learn to estimate by watching adults and by trial and error in situations where they are always highly motivated, because estimation is never a theoretical exercise.

Estimation in hunting and gathering takes place as a matter of course in everyday life. A man estimates how far he can travel before nightfall. When he aims his spear he throws it at the precise angle for it to travel through the air to reach its objective. When the target is a fish under water he must take the refraction of light into account. At all times he must judge the strength of the wind very accurately.

A woman digging yams keeps on digging until, in her estimation, she has enough to feed her family. She might have to take into account the length of the homeward journey. She will weigh up the effort required to dig in hard soil against the estimated size of the yam still in the ground. When she gives her children yams or wood to carry home and carries a load on her own head, she knows just how much can be managed by each person over a certain distance without dropping any enroute.

I have been full of admiration at the way Aborigines know precisely when food is cooked. I have seen oysters cooked while still on the rocks, although I have not even tried to cook them that way myself. Pine needles are placed on top of the oysters, set alight and then doused with sea-water at the exact moment required to cook the oysters without either drying or burning the tiny molluscs. This is

51 *mabiyakarbiyu-manja mamawura* in three days time

yambilyumu-manja yimawura in two months time

yabiyarbuwu-manja yimawura in four months time

a comparatively quick process, but I have observed the same precise estimation of time in longer processes such as when women cook damper. There are numerous other examples.

2.2 TIME

A large number of phrases refer to time in Anindilyakwa. Very likely one person's interpretation of a term varies from another's. In English we too have a varying sense of time. One person's idea of 'a while ago' does not always match another's idea of the same expression. It is also true that one person's idea of 'a while ago' differs according to the context. It is not always easy to pin down an exact English equivalent of the Anindilyakwa terms.

Non-Aborigines are not content to wait. They try to do several other things while waiting for something else to happen, sometimes forgetting the first task in hand. Time appears to pass so quickly when one is well occupied that one loses track of its passing. This is not so with Aborigines. They prefer to concentrate on one thing at a time and avoid the possibility of confusion from trying to do too many things at once. Waiting, in fact, is itself an integral part of the task.

Aborigines know when a damper is cooked because they are content to wait and they know how long to wait. They have a seemingly 'innate' sense of time span without clocks. They also know when it is the right time to do things. Their feeling for time is probably based on long reliance on the sun's movements and on their daily routine. It is now so inbuilt that it is still there without reference to the sun, even in cloudy weather. This sense of time is dependent on the maintenance of the traditional routine or on the firm establishment of a new one.

2.2.1 NATURAL PHENOMENA AS TIME MARKERS

Aborigines are much more aware of changes in the environment than most non-Aborigines are. They automatically observe every alteration in the sun and the moon and in the seasons of the year.

a) Sun and moon

The sun *mamawura* and moon *yimawura* are used for counting the days and months.[51] In the old days hand gestures were used to describe the time of the day at which events took place A person pointing to

52	*kekbadiya adinuba*	it will soon be light
	larruwura akwudangwa	nearly mid-afternoon
	nalarruwuradinama arakba	it is already mid-afternoon
	kumawiyebu-manja mamawura	when the sun sets (future)
	mumawiyebu-manja mamawura	when the sun set (past)
	awankilerrmur.da	nearly night time (literally 'rather dark')

the sky in a certain direction would say *numiyaminuma mamawura* 'the sun was like this'. *Kumiyaminama mamawura* 'the sun will be like this' accompanied the hand gesture to describe the time of day in the future. Old and middle-aged people have retained this method today.

The word *mamawura* 'sun' with the addition of the *d* class prefix is used to describe a clock, *dumamawura*. *Dumamawura dadungwayarrka* 'a clock belonging to the hand' is used for a wrist-watch. The question *mambarrngarna mamawura?* 'How much sun?' is asked of someone with a watch or clock, when a person wants to know the time. An answer in English is expected. (*M* noun class prefixes often occur in time phrases because *mamawura* 'sun' is the noun understood.)

Both *mamawura* 'sun' and *marringa* 'sleep' are used for counting short periods of time. 'Every day' can be translated either *mababurni-langwa marringa* 'every sleep' or *mababurni-langwa mamawura* 'every sun'. Because of the influence of English the latter expression is becoming more common.

For Aborigines on Groote Eylandt day begins at sunrise and not at midnight. Therefore a patient coming to the hospital for treatment at 4 a.m. still refers to the events of the previous day as happening 'today'. We have the fixed idea that the day starts at midnight, and unless we realize that the Aborigines have an equally fixed, though different, idea, confusions can arise.

The basic terms for 'night' and 'day' are *meningalyarrngwalyilya ~ alyarrngwalyilya* 'at night, night-time' and *menungwulida* 'by day, day-time'. Although colour terminology is beyond the scope of this paper, it is of interest to note that *menungwulida* 'day-time' literally means 'belonging to colour' (*alida* 'colour').

There are various terms for the different parts of the day describing the sun's movements and the changes between darkness and light. Vocabulary is especially rich for periods of significant observable change. A few examples only are given.[52]

The terms for morning and afternoon are *wurdarriyu-wiya* 'in the morning' and *larruwura ~ larruwuri-langwa* 'in the late afternoon'. The word *larruwura* is not exactly the same as the English word 'afternoon' because it does not refer to the early part of the afternoon. *Mamerrikuwilyarra* 'midday' includes the early afternoon.

53 *muwilyaba mamarika* *akwa yuwilyaba yinungkwura*
one dry.season.wind and one wet.season.wind

'one dry season and one wet season (one year)'

54 *mibinu-wiya mamarika* last dry season

numangkarrinu-wiya mamarika while the south east winds were blowing

naru-wiya mamarika before the dry season

55 *ebinu-wiya ~ ebini-yada Saturday* last Saturday

engku-wiya ~ engki-yada Saturday the Saturday before last

emininingku-wiya ~ emininingki-yada Saturday the Saturday before that

enu-manja Saturday this coming Saturday

engku-manja Saturday the Saturday after next

emininingku-manja Saturday the Saturday after that

56 *mingku-wiya ~ mingki-yada (mamawura)* the other day (not specific)

mingku-manja (mamawura) the next day

b) Seasons

Time in longer spans than a few months can be counted by the seasons. The two main seasons in the year, the dry and the wet, are marked by the two main winds *mamarika* 'the southeast trade winds' and *yinungkwura* 'the monsoon winds'. 'One year' is the same as one dry season and one wet season. [53]

The seasons are more frequently used for pin-pointing events than for counting periods of time. For instance, events in the past are described as taking place during the dry season or the wet season, or before or after these seasons. [54] (See sections 2.2.2 and 2.2.5 for this use of the suffix *-wiya*.)

One old woman who wanted to indicate a long period of time since a particular event took place began enumerating the names for the different wind directions. As well as four words for winds she included *kirijumija* 'Christmas', which is often used nowadays for 'year'.

2.2.2 TIME SUFFIXES

Many Anindilyakwa suffixes have different meanings in different constructions.

a) Time phrases

In most time phrases, the suffixes *-wiya* and *-yada* occur with reference to past time and *-manja* with reference to future time. The adjectives *enena* ~ *ena* 'this', *ebina* 'same', *engka* 'other', *emininga* 'different' all occur in time phrases. [55] They occur with the *a* noun class, except when nouns of the *m* noun class such as *mamawura* 'sun' are understood. [56]

Note that because the English 'on Sunday' refers to both past and future time, *-manja* is often used referring to both past and future time when suffixed to names of the days of the week.

During the narration of past events, *mingku-manja* 'the next day', normally in a future context, also refers to the next day within the past time sequence. [56]

57	*akini-yada numangkarrinu-manja mamarika nalikenuma angerriba*	at the time when the dry season wind was blowing they went over there
	kinilikaju-manja nakina yangkwurrangwa, akini-yada ngawa akeningmudinama ngarna	when he comes here (at that time) we'll find out
58	*ningilikenu-manja*	when I went
	ningambilyu-manja erriberribu-manja	when I lived in the bush
	kilikaju-manja	when I (will) go, if I go
59	*ningilikenu-murri-langwa ~ ningilikenu-mu-langwa*	after I went
60	*ningilikenu-murru-wa*	before I went
	kilikaja-murru-wa	before I (will) go
61	*naru-wiya kilikena*	before I went
	naru-wiya alikira	before there were houses, while there were no houses
62	*mangkarrkba muwalyuwa aduwaba*	the wild plums are ripe now

The demonstrative adjective *akina* 'that' occurs with the suffix *-yada* to indicate a particular time either in the past or in the future, 'at that time'.[57]

b) Time clauses

In time clauses when the suffix *-manja* and the suffix combinations *-murri-langwa* ~ *-mu-langwa* and *-murru-wa* are added to verbs they indicate various aspects of time. The suffix *-manja* occurs with the past and future tenses meaning 'when'. In the future it also means 'if'.[58] The suffix *-murri-langwa* ~ *-mu-langwa* 'after' occurs with the past tense,[59] and the suffix *-murru-wa* 'before' occurs with the past and future tenses.[60]

'Before' is also expressed in a negative construction, using *nara* 'not' and the suffix *-wiya*. In this case the suffix *-wiya* could be translated 'while' (see section 2.2.5). [61,54]

2.2.3 TIME WORDS

The basic time words are *aduwaba* 'today', *yarrungkwa* 'yesterday' and *arnungkwaya* 'tomorrow'. However *aduwaba* has a wider area of meaning than the English word 'today'. It can include such expressions as 'now', 'nowadays' and 'at this time'.[62] When 'today' is used in its restricted sense, it is often qualified by the time phrase *memu-manja mamawura* 'this very day'.

a) *Ngambi-yada* 'when?'

The suffix *-yada* is added to the interrogative root *ngamb-* to give the meaning 'when'. In most other time expressions *-yada* refers to past time, but in the interrogative *-yada* refers to both past and future time.

63	*nilikenuma arakba*	he's gone now (in conversation)
	neningaba arakba	he's well now
	likaja arakba!	go now!
	ngarrilikaja arakba!	let's go now!
	biya nilikena arakba	and now (then) he went (in narrative discourse)
64	*likaja enenu-wiya!*	go immediately!
	ningardanga angwurra biya akini-wiya numurajanga	I called loudly and jumped up immediately
65	*kabilbayina adinuba*	(the water) will soon boil
	ngambiyada neningabaduma? adinuba	when did he improve? a little while ago
66	*ningeningma arngki-darrba*	I nearly know, i.e. I'll soon learn it
	arngki-darrba kinilyikarrburrukuma	he nearly slipped
	arngki-darrba kinumanguma	he nearly got it
67	*larruwura akwudangwa*	nearly mid-afternoon
	akwudangwa durdurla	nearly bell (time)

b) *Arakba* 'now, already'

The time word *arakba* 'now' focuses on the aspect of completion rather than time at a particular moment. It refers to actions that are already completed and states that have already changed. It is used alone in answer to questions such as 'Have you finished?' and 'Has he gone?'. It is also used with the imperative and hortatory moods to elicit an immediate response. In narrative discourse it occurs frequently and may be translated by both 'now' and 'then' in English.[63]

Sometimes *arakba* 'already' translates the English 'after', as in a discussion about when an event took place, e.g. *wiyerrirda arakba* 'cyclone already' translates 'after the cyclone'.

c) *Enenu-wiya, akinu-wiya* 'immediately (now, past)'

The suffix *-wiya* added to the demonstrative *enena* 'this' gives the meaning 'immediately, now'. It is used less than *arakba* 'now' but unlike *arakba* it is an answer to the question 'when ...?'.[64] When 'immediately' refers to an event in the past, *akinu-wiya* literally 'that while' is used.[64]

d) *Adinuba* 'soon', 'recently'

This word is used to refer to actions about to happen or having just happened and to states just changed or about to change. It has a more restricted area of meaning than the English words but is frequently used alone in answer to the question 'when...?'.[65]

e) *Arngki-darrba* 'soon', 'nearly'

Another word for 'soon' is *arngki-darrba*, literally 'time short'. With reference to a past event *arngki-darrba* occurs with a verb in the subjunctive mood meaning 'nearly'.[66]

f) *Akwudangwa* 'nearly'

The primary meaning of *akwudangwa* is 'near' in the spatial sense. The Anindilyakwa speaker sees a close connection between distance and time. Therefore *akwudangwa* also means 'nearly' when it is used with an adverb of time or a noun in reference to a future event or change of state. This word is also used alone in answer to the question 'when ...?' and may sometimes be interchangeable with *adinuba* 'soon'.[67]

68	*nara kinirringka nakina umba aduwabu-manju-bu*	I've never seen him before until today
	nara kumarringka makwiyadakina diraka umba adinubu-manju-bu	I've never seen that kind of truck until recently
69	*ar...akba-wiya ~ arakba-wiye-ka*	a very long time ago (see Appendix 1)
	arakba-wiya	long ago
	awank-arakba-wiya	a rather long time ago
	wilyarru-wilyarra	not so long ago (literally 'middle middle')
	awank-adinuba	a fairly short time ago
	adinuba	a short time ago
	adinube-ka ~ yarrungkwi-yarrungkwa	a very short time ago (literally 'yesterday yesterday')
	adinube-ka	very soon
	adinuba	soon
	awank-adinuba	fairly soon
	ambaka	later
	ambaka amiyerra	much later

g) *Aduwabu-manju-bu* 'today, for the first time'

A positive answer to such questions as 'Have you ever seen...?' is the idiomatic expression *aduwabu-manju-bu* 'today, for the first time'. This construction combines *aduwaba* 'today' with the suffixes *-manja* 'on, at' and *-bu* (emphasis). The parallel constructions *adinubu-manju-bu* 'recently for the first time' and *yarrungku-manju-bu* 'yesterday for the first time' combine *adinuba* 'recently' and *yarrungkwa* 'yesterday' with the same suffixes.[68]

2.2.4 SEQUENCING AND COMPARISON OF TIME

The basic words in the sequencing of time are *arakba-wiya* 'long ago' and *adinuba* 'recently,soon' (see section 2.2.3). These words can be modified in various ways to denote different intervals of time with respect to the present.[69] When comparing one past event with another, the intensifier *angwurra* 'more' is used giving *arakba-wiya angwurra* 'a much longer time ago'. When comparing one future event with another, *amiyerra* 'continuing' is used giving *ambaka amiyerra* 'much later'.

70 1. *likaja nungkuwa adinuba-wiya umba ngayuwa kilikajama arijilangwa*
go you first but I I.will.go afterwards

2. *lyengmena nungkuwa umba ngayuwa karijidinama arijilangwa*
lead you but I I.will.go.last afterwards

Both 1 and 2 mean the same, 'You go first and I'll go last'.

71 *adinuba-wiya kilikajama shop-uwa,*
kembirra arijilangwa kingangarrenama
dakina akwa kingaminarjirrenama
dumbala ngalilangwa akwa
kingaminidakinama aninga

First I will go to the shop, then afterwards I will visit her and wash her clothes and cook her food.

72 *wurrababurni-langwa wurriyukwayuwa*
nalikenuma waranjubawiya

all the children came early (literally 'quickly')

yikilikaja waranjubawiya nara ambakilangwa
you.will.come quickly not slowly

'Come quickly and not slowly!'

a) *Adinuba-wiya* 'beforehand, first'

The adverb ***adinuba-wiya*** means primarily 'beforehand, first'. It is a compound word, combining ***adinuba*** 'soon' and the suffix ***-wiya*** which occurs in time phrases. [70]

b) *Arijilangwa* 'afterwards, last'

The adverb ***arijilangwa*** means primarily 'afterwards, last'. This word has the same root as ***-arijidina*** 'come, go last'. The suffix ***-langwa*** occurs on verbs meaning 'after', and ***-ariji-*** may have occurred alone in the past, but not today. [70]

c) *Adinuba-wiya* and *arijilangwa*

Because time was not measured in the absolute sense, the concepts 'early, earlier, earliest' used to be less significant than they are today. Now because of the introduction of the clock the meaning of ***adinuba-wiya*** 'first' has been extended and the concept of earliness included. Similarly ***arijilangwa*** 'last' has been extended to include 'late, later, the latest'.

When ***adinuba-wiya*** 'first' and ***arijilangwa*** 'afterwards' describe consecutive events, only one can be ***adinuba-wiya*** but several following events can be ***arijilangwa*** 'afterwards, later'. [71] This sequence corresponds with English. However, people arriving after the first arrival come ***arijilangwa*** 'afterwards, later' in relation to other people, even though they may still be in time for the following event.

Reference to a number of people all arriving early might seem to create a problem in Anindilyakwa. In this case an Anindilyakwa speaker would use ***waranjubawiya*** 'quickly' to translate the English 'early'. [72]

A teacher frequently wants to say to the children, 'Come early and don't be late!' The concept is not lacking, but once again we need to forget our favourite word 'early' and verbalise the concept differently for effective communication, using the adverb 'quickly' or an adverbial phrase such as 'before the bell'. Children arriving late for school after the bell has rung can be reprimanded for coming ***arijilangwa*** 'late'.

73 *enungw-adinuba-wiya alawudawarra* — the first story

menungw-arijilangwa mijiyanga — the last boat

nenungw-arijilangwa nenungkwarba — the last man

74 *niliraka adinakba angwura* — he lit the fire (in readiness for cooking)

75 *numudayinuma nenungw-amiyerra* — he was paddling for a long time

ning-enungkwurakba angbilyuwa — I have been sick for a long time

76 *nening-angkawura nambilyuma yelakwa* — he always lived here

ngarriyekirrerra akambilyama ngarning-angkawura — we will be happy all the time

The adjectival form of *adinuba-wiya* 'first' and hence also 'earliest' is *ening-adinuba-wiya ~ enungw-adinuba-wiya*. Similarly the adjectival form of *arijilangwa* 'last' and hence also 'latest' is *ening-arijilangwa ~ enungw-arijilangwa*. Both words are formed by prefixing *ening- ~ enungw-* 'belonging' to the adverb.[73]

d) *Adinakba* 'first'

The adverb *adinakba* 'first' carries the idea of preparation in readiness for a foreseeable event. In a non-future oriented society it is normally an event which is imminent.[74] Because of this specialised meaning it is not used as frequently as *adinuba-wiya* 'first'.

2.2.5 DURATION OF TIME

The suffix *-wiya* is added to *aduwaba* 'today' to give the meaning 'during the day', i.e. just for the day. The suffix *-ma* is added to *marringa* 'night ~ sleep' to give the meaning 'for the night, overnight'.

'For a little while' is expressed by the adverb *aduwaya*. 'For a long time' is normally expressed by idiomatic constructions formed by adding adjectival and pronominal prefixation to the adjectives *amiyerra* 'continuing' and *enungkwurakba* 'old'. *Ning-enungkwurakba*, literally 'I old', can mean 'I have been waiting for a long time'.[75]

A similar construction is formed using *arngkawura ~ angkawura* 'once' to give the meaning 'always'.[76] In answer to the question 'Will he come back?' the answer *nening-angkawura* means that he has gone for good, i.e. for the foreseeable future, although in fact this could happen to be merely for a few months.

77 *numungkwulingu-wiya nakina nenar.dirranguma* — while he slept they speared him

nambilyu-wiya ~ nenibu-wiya — while he was alive

niyukwujiyu-wiya — while he was small

ningeningbalu-wiya — while I didn't know

78 *ning-alilikenu...wa*
I-went.went
'I kept on going.'

(see Appendix 1 for explanation of *alilikenu...wa*)

ningarikumina wurdarriyuwiyu...wa
he.fished morning
'He was fishing all the morning.'

nilikena ngawa nakinu...wa
he.went still he
'He kept on going.'

79 *ekbarra ambaka* — the headache is still there

arukwa ambaka — still raw

ardirdarra ambaka — still hot (i.e. still too hot, so not cool enough)

angemina nalyubarinama ambaka — he is still being suckled

80 *ningkenirringka ambaka?* — Have you seen him yet?

nara ambaka kinirringka — I haven't seen him yet

ningkenirringkama ambaka? — Have you ever seen him?

nara kinirringka — I've never seen him

a) The suffix *-wiya* 'while'

The suffix *-wiya* 'while' occurs on verbs in the past tense to describe the continuing action during which a past event took place. It also occurs on adjectives describing continuing states.[77] It is not used as frequently as 'while' is used in English. Note the phrase *naru-wiya* 'before (not while)' in section 2.2.2.

b) The suffix *-wa* 'extension of time'

The suffix *-wa* is added to a verb, adverb or pronoun in sentence final position to emphasise 'extension of time'. The final vowel *a* of the word to which *-wa* is added is replaced by *u* and it is long and drawn out. This is symbolised by the insertion of three dots (see Appendix 1).[78] Partial reduplication of the verb root may co-occur with this phenomenon and is underlined in the example. The tone is high throughout the word until the last syllable, which has a sharply falling tone.

c) *Ambaka* 'later', 'still'

The aspect in focus in this time word is a state which extends from the past into the present but normally anticipates change. In answer to a question such as 'Are you ready to go?' the answer *ambaka* 'later (soon but not yet)' may be given to delay the departure, even for only a short time. The idiom *ambaka jayi*, literally 'later away', is used as a delaying tactic, the equivalent of 'wait a minute'.

When waiting for an expected change the word *ambaka* is used where English uses 'still', sometimes meaning 'still too...', according to the context.[79]

Although *ambaka* can be translated 'yet' and 'ever' according to the context, the negative construction *nara ambaka* 'not yet' implies the possibility of change and thus cannot be translated 'never'.[80]

d) *Ngawa* 'still, enough'

The primary meaning of *ngawa* is 'still'. It is used when a change in the current situation or state has not taken place, is not expected and in fact is not warranted or required. This word is used when the positive aspect is implied by 'still ... enough' in English.

81	*ardirdarra ngawa*	still hot (enough)
	eniŋgaba ngawa	still all right
	nakina ngawa	he's still there ~ he's still the same
	neniba ngawa	he's still alive
	numungkwulinga ngawa	he was still sleeping, he kept on sleeping
	nuwaranga ngawa	he still refused
82	*ena ngawa*	this is all
	akinu-bu ngawu-da	that's the end
83	*numebumebinuma*	he used to sing, he went on singing
	numudumudayina	he kept paddling
	nara kinawiyuwiyeba	he never used to go inside
84	*nara alikanguma nakina*	he's not going
	nara kinalilikaja nakina	he never goes

However, when the negative aspect is implied by 'still too ...' in English, the Anindilyakwa *ambaka* is used.

Note the use of *ngawa* with reference to continuing actions, often translating the English 'keep on ...'.[81]

Because of the positive implication of *ngawa* it is not used with *nara* 'not'. 'Not enough', in the sense of 'not cooked enough', is expressed positively using an opposite concept.[79,81]

Ngawa 'enough' is used alone as a normal polite answer to such questions as 'Would you like something to eat?'. It is thus the equivalent of 'No thank you' in English but it is phrased from the positive point of view of a person satisfied with his present state.

The idiom *ningena ngawa,* literally 'I (this one) enough', is another polite expression. It is used in answer to such questions as 'Are you all right, i.e. comfortable?' when no change is needed.

The idiom *ngawa arakba,* literally 'enough now', is used as a command to stop an action, equivalent to 'that's enough!'.

Several idiomatic expressions occurring as closure of a discourse all include *ngawa* 'enough'. This extends the underlying implication of satisfaction with the status quo to a sense of finality.[82]

e) Habitual and continuous action

Habitual action and action which takes place over a long period of time are signalled by repeating part of the verb root. The part of the word that is reduplicated has been underlined.[83]

Except for one instance the pattern of prefixing and suffixing verbs is the same whether reduplication occurs or not. However when reduplication occurs on a verb in the present tense, in the negative mood, the past negative prefix is used with the present positive suffix instead of the normal present negative affixation.[84]

In English 'never' is frequently used in the negative 'I never went ~ go, I will never go'. Compare the Anindilyakwa translation of 'I have never seen him' in example 80.

85	*mebina ngawa!*	keep on singing!
	wijijirena ngawa!	keep on pushing it!
	kinumakumakina ngawa!	always tell him! keep on telling him! (you will keep telling him)
86	*naru-wiya kinambilya*	before he was (born)
	nirumungkwar.dinu-wiya arakba	when he was already crawling
	naru-wiya wiyerrirda	before the cyclone
	nijerridu-manja yalyukwa	when the rain finished (at the end of the wet)
	nuwambilyu-manja wurrakina yelakwa alukwanji-yada	when ~ while they were here for the dancing

Commands to keep doing something habitually or continuously are translated by the future tense in Anindilyakwa unless the action to be continued is already in progress when the imperative is used, sometimes with reduplication.[85] However the verb *-likaja* 'go' never takes reduplication in the imperative.

2.2.6 INTRODUCED TIME WORDS

Names for the days of the week and the months of the year have been borrowed from English, in addition to the terms 'week' and 'Christmas' (used for 'year'). 'Sunday' is sometimes used for 'week'. All these words have been introduced into the *a* noun class.

Old people today differentiate between certain days of the week. The days Monday, Tuesday and Wednesday are described as ***aruma***, literally 'big', but Thursday and Friday are described as ***ayukwujiya***, literally 'little'. Because pension cheques arrive on Thursdays, on the previous day one can ask one of the old women the following question:

arnungkwaya ayukwujiyu-manja na?
tomorrow little-on interrogative

This question will be interpreted as 'Tomorrow is Thursday, pension cheque day, isn't it?'. When Thursday comes, the old women frequently say, *'aduwaba ena ayukwujiya'*, literally 'today this little'.

2.2.7 EVENTS AS TIME MARKERS

Time is related to events and life-stages, for which the Aborigines have very keen memories. Important events are used to mark the time when events of minor significance are described. Events are also described as taking place during a certain person's life-time, before so and so was born, after so and so died, and so on.[86] My *kayuwa* 'dilly-bag', made by one of the women some years ago and still in use, is frequently commented on in the following way:

'So and so made it while her mother (now deceased) was still strong.'

(See section 2.2.2 for more examples.)

2.2.8 VERB TENSE AND MOOD

a) Present and future tenses

English speakers use the present tense with future meanings, e.g. 'I am going to Darwin next week'. English also uses the present tense in such phrases as 'he runs fast' and 'he can skip'. Anindilyakwa

87 *ambakilangwa nilikajama* *kinilikajama Darwin-uwa arnungkwaya*
slowly he.goes he.will.go Darwin-to tomorrow

'He's walking slowly.' 'He's going to Darwin tomorrow.'

angwurra kinangkarrinama *kinilukwayinama nakina*
fast he.will.run he.will.dance he

'He runs fast ~ he can run fast.' 'He will dance ~ he can dance.'

88 *ku-wurdenama ngayuwa angabu-manja eka*
I.will-climb I that-in tree

'I will climb that tree.'

ngayembirra ku-wurdiya?
I.in.turn I.will-climb (near future)

'Shall I climb now?'

89 *ningijerrukwa* I finished (one form only)

ningidaka I cooked (one form only)

ningiyar.da I arrived (near past)

ningiyar.danga I arrived (normal past)

90 *ebinu-wiya niyar. danga nakina* he arrived the other day

nara kiniyar.danga he didn't arrive

naru-maka kiniyar.danga aduwaba he should not have arrived today

Ngambiyada niyar.danga? when did he arrive?

91 *yarrungkwa niyar.danga ~ niyar.da nakina yelakwa* he arrived here yesterday

yarrungkwa niyar.danga nakina yelakwa alika-ma he arrived here on foot yesterday

yarrungkwa niyar.da nakina yelakwa larruwuri-langwa he arrived here yesterday in the afternoon

nalikena arakba adinuba wurrakina they have just gone

is more precise and normally limits the use of the present tense to events happening at the present time, using the future tense for all other situations.[87] There are two forms of future tense, one of which refers to the near future only.[88]

b) Past tense

There are usually two forms of the past tense. One has been labelled the 'normal past' and the other has been labelled the 'near past'.[89] The normal past tense is more common that the near past. It always occurs in the negative and subjunctive moods, and normally in the interrogative mood.[90]

The near past tense occurs describing some actions which have taken place within about the last twenty-four hours. The choice of the form of the past tense depends on whether time is in focus or not. If time is in focus, then the near past is used. In the examples, the action took place during the last twenty-four hours and in each case a time word is included. The normal past tense is used for the verb 'go' regardless of focus.[91] The near past tense is underlined in each example.

92 *nalawurradina angalyu-wa* — they went (returned) home

nardanga nakina wurruwardu-wa biya nalawurrada aburraja enuwa-wa — he called out to the dog and it came straight back to him

niyar.danga nakina mijiyelyi-langwa biya waranjubawiya nilika ~ nilikena dadiyuwangku-wa naru-wiya kinalyubarina aninga — he arrived from the beach and went quickly to the old woman before he had anything to eat

nangkarrina nakina mangabu-langwiya mamurukwa school-uwa — he ran to school along that path

nardanga neniyuwangkwa biya eneja niyukwujiya nangkarra — the old man called out and the child ran away

93 *lukwayina!* — dance! (one form only)

alyubarina! — eat! (one form only)

angkarrina! — run!

angkarra! — run immediately!

lawurradina! — return!

lawurrada! — return immediately!

wumena! — take it!

wumiya! — take it immediately! pick it up!

94 *ki-likaja adinuba hospital-uwa*
you.will-go soon hospital-to
'Go to the hospital soon.'

95 *wumiya bangkilya akwa ridiya ena eka enu-wiya* — take the tomahawk and chop this tree straight away

wumiya bangkilya akwa kiridiya angaba eka — take the tomahawk and chop that tree over there

wumiya ~ wumena ~ kumiya bangkilya nganyangwa biya kiniridiya yangaba yimundungwa larruwura — take my tomahawk and (then) chop that cypress over there this afternoon

In a narrative the normal past is used except when the near past tense focuses on a short interval of time between consecutive actions. The use of the near past for the verb 'go' is legitimate but not favoured by young people today.[92]

c) Imperative mood

Verbs in the imperative mood often have two forms. The difference in meaning between the two forms is that one of them anticipates a more immediate response and so is also used for peremptory commands.[93] In English the imperative mood, like the present tense, can refer to the future, but in Anindilyakwa the imperative mood cannot refer to the future.[94]

When two commands are given, the imperative is used for both commands when an immediate response is required. When any interval of time is involved, the future tense may be used for one or both commands. The immediate imperative has been underlined in the examples.[95]

96 *adinubawiya kijerrukwuna warka nungkwulangwa kembirra*
first you.will.finish (complete) work your then

arijilangwa kilikaja errekbu-wa
afterwards you.will.go outside-to

'Finish your work and then go outside.'

97

akwudangwe-ka ~ akwu...dangwa	very near (see Appendix 1)
akwudangwa	near
awank-akwudangwa	not far away, quite near
wilyarra	part-way
awank-engku-manja ~ awank-engku-wa *awanku-wilyikerra ~* *awanku-wurrikalya*	rather a long way off
engku-manja ~ engku-wa *awilyikerra ~ awurrikalya*	far away
engku-manje-ka ~ engku-we-ka *awilyikerre-ka ~ awurrikalye-ka*	very far away

98

wurrangamba? engku-wa wurrakina	where are they? they are a long way off
engku-manja nuwambilyama	they live far away
murungwena akwudangwa makina	the jungle is nearby
murungwena muwank-akwudangwa	the jungle is quite near
murungwena muwilyikerra	the jungle is far away
wurruwilyikerra warnumamalya	the people are far away

99 *likaja engku-wa angwurra!* go further away!

The teacher who says 'Go outside when you finish writing' should not be surprised if the children jump up and go straight outside, especially as the English word 'finish' is usually interpreted as a completed action rather than an action requiring completion. An Anindilyakwa speaker would be more likely to say something such as 'Finish your work and then go outside'.[96]

2.3 DISTANCE

Time and distance are closely connected, e.g. 'As far as Darwin' is only another way of saying, 'until one has reached Darwin'. A short distance means that a short time is required to cover that distance. Thus ***arngkidarrba*** 'soon' is also used for 'near' and ***akwudangwa*** 'near' is also used for 'soon'. Similarly *yandi-langwa*, 'until' in a time phrase, translates 'as far as' with reference to distance. In English the underlying link between time and distance is less explicit.

The basic terms to describe positions of relative distance are the adverb ***akwudangwa*** 'near' and the adjectives *awurrikalya ~ awilyikerra* 'far away'. ***Engku-manja*** 'in another place' is also used for 'far away'. ***Engku-wa*** 'to another place' can be used for 'in another place' and thus for 'far away' in addition to its literal meaning. The adjectival prefix ***awank-*** 'rather' and the emphatic suffix *-ka* occur in the comparison of distance which is listed opposite.[97] Note the noun class agreement in the use of these words.[98] The intensifier ***angwurra*** 'more' may be used with ***engku-wa*** 'far away' to indicate 'further away'.[99]

The English term 'half-way' is often used by Aborigines speaking English, but as this is used in the sense of 'part-way' it can be very misleading when giving directions. (See the reference to 'part of' in section 1.2.3.)

Verbs of motion have certain features added to express a great distance and thus a great length of time (see section 2.2.5).

100 *mijiyelyu-manja wurrakina*
beach-at they

'They are at the beach.'

akwalya makardu-manja
fish sea-in

'The fish is in the sea.'

akwalya angwuru-manja
fish fire-on

'The fish is on the fire.'

angwuru-manja dakina
fire-by she

'She's by the fire.'

101 *arumu-manja alikira nakina*
big-in house he

'He's in the big house.'

102 *angabu-manja alikira arumu-manja ~ aruma wurrakina* they're in that big house

awilyabu-manja alikira arumu-manja ~ aruma wurrakina they're in one big house

enungkwurakbu-manja alikira arumu-manja ~ aruma wurrakina they're in the big old house

103 *ningiyar.danga nuwambilyu-murru-manja*
I.arrived they.stayed-statement.of.fact-at

'I arrived where they were staying.'

ningambilya nuwambilyu-murru-manja
I.stayed they.stayed-statement.of.fact-at

'I stayed where they were staying.'

2.4 POSITION

2.4.1 STATIONARY POSITION

Some people in cities can list long lists of railway stations in their order. In just the say way, one old woman recited to me over a hundred names of places in their order along a section of the coast of Groote Eylandt. The whole island is a network of named places.

The importance of kinship ties and avoidance rules necessitates continual observation of the position of people. An account of past events demonstrates this precise awareness of position. The description of a school camp will probably include a detailed account of who slept next to whom.

The concept of stationary position in Anindilyakwa is expressed in various ways, including suffixing, adverbs and adjectives.

a) The suffix *-manja* 'at, in, on, by'

The one suffix *-manja* translates the following English prepositions: 'at', 'in', 'on' and 'by'. The exact meaning is made clear by the context.[100] Compare the English 'at the shop' which can mean 'in' and 'near'.

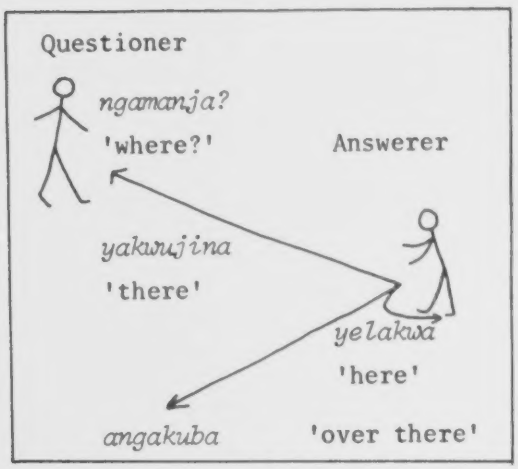
When a noun is qualified by an adjective, the suffix is attached to the adjective instead of to the noun.[101] When a noun is qualified by a demonstrative or a numeral adjective as well as by a descriptive adjective, the suffix is attached to the demonstrative or numeral adjective which precedes the noun, or to both. When a noun is qualified by two descriptive adjectives, one precedes and takes the suffix and the other follows the noun with or without the suffix.[102]

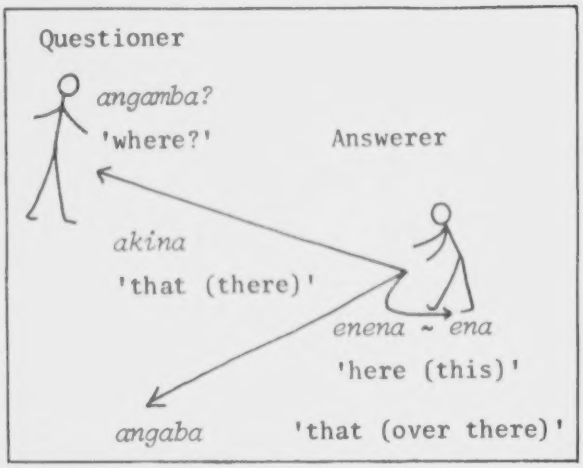
b) The combined suffixes *-murra* + *-manja*

Note the combination of suffixes *-murru-manja* 'statement of fact + at' occurring on verbs. This construction translates the English 'where', or 'at the place where.'[103]

104 *kuwambilyama* *wurrakina* *yilyaku-murru-manja*
they.will.stay they wild.honey-having-at

'They'll stay where there's wild honey.'





Adverbs

Question:

nga-manja jurra ningkakumarnuma
where-at book you.put

'Where did you put the book?'

Adjectives

Question:

angamba jurra
where book

'Where is the book?'

The combination of suffixes *-murru-manja* occurring on nouns translates the English 'where there is', or 'at a place where there is'.[104] This construction has been translated 'having + at' because it parallels such possessive phrases as:

ni-jinabu-murra nakina
he-gun-having he

'He has a gun.'

c) *Nga-manja* and *angamba* 'where (in what place)?'

There are two words for asking the question 'where?'. In Anindilyakwa *nga-manja* 'where?' is adverbial and *angamba* 'where?' is adjectival. The two diagrams opposite illustrate the use of the appropriate adverbial and adjectival forms for asking and answering the question 'where?'. (The two people depicted in these diagrams are talking to each other. They are separated by some distance. The answers are explained under the diagram.)

d) Adverbs and adjectives of place

The basic words for 'here' are the adverb *yelakwa* and the demonstrative adjective *enena ~ ena*. The basic words for 'there' are the adverbs *yakwujina* and *angakuba* and the demonstrative adjectives *akina* and *angaba*.

In the opposite diagram the answers *yelakwa* and *enena* refer to an object close to the person answering the question 'where?'. The answers *yakwujina* and *akina* refer to an object close to the person asking the question, and the answers *angakuba* and *angaba* refer to an object at a distance from both speakers.

If two people are close together, *yakwujina* and *akina* 'there' refer to a short distance away, and *angakuba* and *angaba* 'there' refer to a distance further removed from the speakers.

The demonstrative adjectives can also be translated 'here it is' etc., in which case they can be appropriate answers to the question *ngamanja ningakumarnuma* 'Where did I put it?'.

105	*ningambilyu-manja ngayuwa Darwin-manja ningenirringka angakuba ~ yakwujina*	when I was in Darwin I saw him there
106	*angamba jurra nungkwulangwa?*	where's your book?
	angalyu-manja angakuba-wiya	it's at home (I left it there)
	angamba jurra nganyangwa?	where's my book?
	angalyu-manja yakwujinu-wiya	it's at home (I saw it there)
107	*ababurna amurndakijika shop-manja awurrekerrekba*	there are a lot of things displayed in the shop
108	*alikiru-manja arrawa*	inside the house
	nangamba? arrawu-manja ~ arrawa	where is he? inside

The adverbs *yakwujina* and *angakuba* 'there' can also refer to a position out of sight and are interchangeable in some contexts.[105] Note the difference of perspective, however, in the sentences containing *yakwujinu-wiya* and *angakuba-wiya*.[106]

In answer to the question *dangamba?* 'Where is she?' the reply *dangaba-wiya ~ angakuba-wiya angalyu-manja* 'She's at home' can be given by someone who knows, having come from the same place. It means in effect 'I've left her there ~ she was there when I left'.

Arrawa means 'inside' and also 'below, down low, beneath, underneath'. The two meanings for the one word did not cause confusion when they were used in context in pre-technological days. At that time there was nothing a person could get inside as distinct from underneath, like the buildings and vehicles of today. To sit inside and underneath a shelter were one and the same. To be inside a cave meant to be underneath the overhanging rock. People sit beneath the trees but not inside them. Eggs are always found inside the nest and not beneath. People are normally inside a canoe and fish in the water below - unless the canoe is high and dry, in which case one does not expect to find either people or fish underneath! Examples could be multiplied. In other words, the context made the intended meaning plain.

The word *errekba* 'outside' is interesting because of its association with the jungle. It means in the clear area away from thick growth, and by extension today it means outside buildings etc. The adjective *awurrekerrekba* 'out in the open, on display' is used by old people referring to people and things in the plural.[107]

Arrawa and *errekba* optionally take the suffix *-manja* 'at, in, on, by' when a noun is absent.[108]

Karrawara ~ abalkaya can be translated as 'up high' and 'on top' as well as 'above'. 'Very high' and 'right up on top' are expressed by the words *karrakarrawara, karraware-ka* and *abalkaye-ka*.

109 *mirriku-wilyarra murungwenu-manja*
jungle-middle jungle-in

'in the middle of the jungle'

110 *eningu-wilyarra alikira* — the middle house

111 *mambilyuma diraka marndadikena ~ marndadikakena* — two trucks side by side

ngayuwa arndadikena ~ arndadikakena ningambilya diraku-manja — I was on the side of the truck

mema cup marndadikena nganyangwa, makina marndadikena ngalilangwa umba memingu-wilyarra nungkwulangwa — the cup on this side is mine, the one on that side is hers and the one in the middle is yours

112 *yaliniyalina nalikena enuwa-manja* — they walked along each side of him

yaliniyalina miyangkidirrbura malamukwa — the straight sides of the canoe

113 *Emeda adadibina umba Angurrkburna alalubaja* — Lake Emeda is on this side and Lake Angurrkburna is on the other side (i.e. further away from here)

neniyuwangkwa adadibina umba niyukwujiya alalubaja — the old man is on this side and the little boy is on the other side (i.e. further away from here)

The adverb ***wilyarra*** 'between, in the middle' describes any position within a circle and also between two extremities, either vertical or horizontal. It also occurs with a number of prefixes which represent nouns.[109] (See Appendix 2 regarding noun prefixation.) An adjective is formed from the adverb by the addition of the prefix ***eningu-*** 'belonging'.[110]

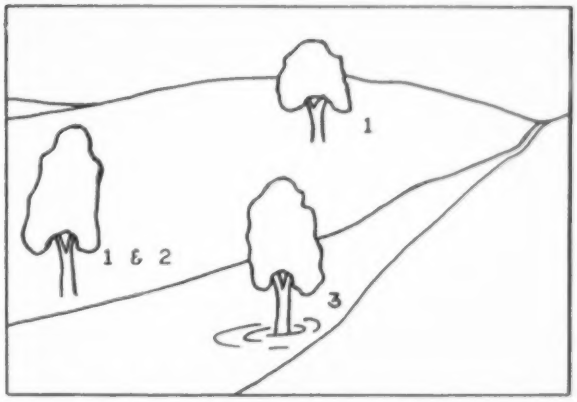
Arndadikena ~ ***arndadikakena*** 'side by side, at one side, on the side' is a compound word formed from ***arnda*** 'elbow'. It describes the position of a person in relation to an object or of one object in relation to another object but does not describe two people 'side by side'. This word is invariable when the focus is on the position of the person, but adjectival when the focus is on the object.[111]

The adverb ***yaliniyalina*** 'on each side' describes a position with reference to people and vertical objects. By extension it refers to the two sides of a canoe or two opposite walls of a building but not to all four walls.[112]

The adverbs ***adadibina*** ~ ***adibina*** 'on this side' and ***alalubaja*** ~ ***alubaja*** 'on the other side' refer to positions with respect to people, things and places.[113] They can occur alone in answer to questions.

114 *ayak-adibina ~ ayaki-lada* — on this side of the river

ayak-alubaja ~ ayaku-warra — on that side of the river



1. *eka ayaku-bidjina adalyumu-manja*
   tree river-beside river-at
2. *eka arndadikena adalyumu-manja*
   tree at.the.side river-at
3. *eka ayaku-wilyarra adalyumu-manja*
   tree river-middle river-at

(The numbers of the examples refer to the positions of the trees in the sketch.)

115 *ningumurndadina ningena ningangmakwulalu-baba angwurrkidirrburu-baba edirra* — I was cold because I was sitting opposite the door

malamukwa mangaba nara angwurrkidirrbura angkayuwaya makina umba mungwurrki-dirrbura muwarraku-manja makina — the canoe over there isn't opposite the tamarinds but it's opposite the casuarina trees

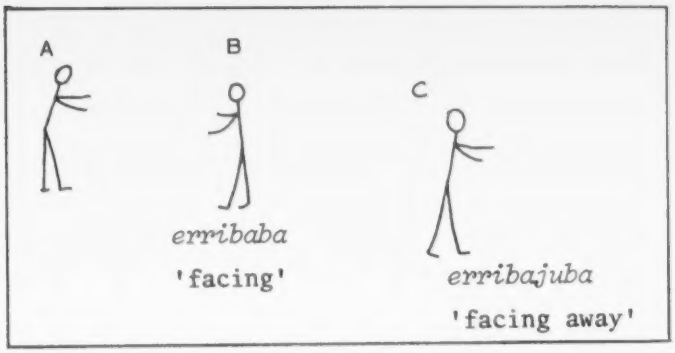
These words also refer to specific objects when prefixes are added representing nouns.[114]

The same positions can be described by the adverbial roots *-lada* 'on this side' and *-warra* 'on that side'. These can only be used with prefixes representing nouns.[114]

The root *-bidjina ~ -bijina* 'beside ~ near' cannot be used alone. This root and the roots *-lada* and *-warra* described above are complicated by having a number of prefixes added which represent nouns and therefore do not generally occur in the vocabulary of small children.

The opposite diagram shows how the general suffix *-manja* 'at, in, on, by' occurs supplemented with more specific expressions.

When referring to position in relation to something inanimate, 'opposite' is translated by the adjectives *angwurrki-dirrbura* and *angwurrku-wiyida*. They are formed from the adjectives *adirrbura* and *awiyida* 'straight' which are prefixed by the morpheme *-ngwurr-* representing *edirra* 'hole, mouth'.[115] When a boat's position is opposite a particular landmark, the word 'opposite' agrees with the noun class of that landmark.



116	*yingangmakwulaluma yingabuluwenduma yakwujina*	she sat there with her head down
	wabuluwendijiya jurra (bajikala)	turn over the page ~ book (tin)
	mabuluwendijiya makina malamukwa	tip the canoe over
117	*nalyilyaduma nakina eku-manja ayarrku-murra*	he was hanging from the tree by his hands
	yerrerra nalyilyaduma alikiru-manja	the ladder was leaning against the house
118	*nilikena alikira-wa*	he went to the house
	nilikena aruma-wa alikira	he went to the big house
	nilikena angaba-wa alikira aruma-wa ~ aruma	he went to that big house
	nilikena awilyaba-wa alikira aruma-wa ~ aruma	he went to one big house
	nilikena enungkwurakba-wa alikira aruma-wa ~ aruma	he went to a big old house

When referring to position in relation to people, 'opposite' is translated by the adverb ***erribaba*** as indicated by the opposite diagram. The person labelled B is facing towards a person labelled A, that is they are opposite one another. The person labelled C is facing away from the person labelled A. This position is described by ***erribajuba*** 'facing away'.

e) Verbs indicating position

There is a special term for people and animals facing each other, being opposite one another. This position is expressed by a verb, e.g. ***yikirukwayina*** 'we sat opposite each other'.

The English adverbs 'upside down' and 'head down' are rendered by a verb in Anindilyakwa. This includes any position with the head lowered, from ducking down to standing on one's head. It also translates the action of tipping or turning things over when the causative suffix ***-ji-*** is added, as underlined in examples 116.

The two English concepts 'hanging' and 'leaning' are translated by one verb in Anindilyakwa.[117]

2.4.2 MOTION TOWARDS

a) The suffix ***-wa*** 'to'

The suffix ***-wa*** describes motion towards objects, people and places. When a noun is qualified by an adjective, the suffix is attached to the adjective instead of to the noun, as is the case with the suffix ***-manja*** 'at, in, on, by' (see section 2.4.1).[118]

Sometimes ***-wa*** 'to' in Anindilyakwa translates the English 'from', as in the following example:

wangkirna	*aninga*	*alikira-wa*
fetch	food	house-to

'Fetch the food from the house.'

Sometimes ***-wa*** 'to' occurs on a noun as an alternative for the suffix ***-yada*** 'purpose' and translates the English 'for', as in the following example:

likaja	*erriberriba-wa*	*mangkarrkbu-wa* ~	*mangkarrkbi-yada*
go	bush-to	plum-to	plum-for

'Go to the bush for plums.'

119 *ningilikena nuwambilyu-murru-wa* *wurrakina*
I.went they.stayed-statement.of.fact-to they

'I went to the place where they were staying.'

120 *nara alikanguma dingarrbiyu-murru-wa*
not go crocodile-having-to

'Don't go where there are crocodiles.'

121 *kwa ~ likaja yangkwurrangwa!* come here!

likaja angerriba! go over there!

122 *ngilikaja-wiya angerriba umba yibarringkinama yangkwurrangu-murru-wa*
let.me.go-just to.there but I.will.see.you to.here-fact-to

'Let me just go over there. I'll see you when I get back.'

erribulena kumambarrinama Gove-manja yangkwurrangu-murru-wa
plane it.m.will.sit Gove-at to.here-fact-to

'The plane will stop at Gove on the way here.'

wulalika akina eka yiridena yangkwurrangu-murru-wa
it.a.leave that tree we.will.chop to.here-fact-to

'Leave the tree. We'll chop it on the way back.'

b) The combined suffixes *-murra + -wa*

The combination of suffixes *-murru-wa* 'statement of fact + to' occurs on verbs. This construction translates the English phrase 'to where' and parallels *-murru-manja* 'where' (see section 2.4.1).[119]

The suffixes *-murru-wa* occurring on verbs of motion have the meaning 'before' (see section 2.2.2).

The combination of suffixes *-murru-wa* occurring on nouns and translated 'having-to' parallels *-murru-manja* 'having-at' (see section 2.4.1).[120]

c) *Ngambu-wa* 'to where?'

The interrogative 'to where?' is *ngambu-wa?* This word is often used for the English '(at) where?' with reference to people, e.g.:

ngambu-wa nakina? 'Where is he? (To where has he gone?)'

Ngambu-wa? 'to where (are you going)?' is frequently used as a form of greeting at any time of day to initiate conversation.

d) Adverbs indicating Motion towards

The basic term for the direction 'to here' is *yangkwurrangwa* and the term for 'to there' is *angerriba*.[121] *Yangkwurrangu-wiya* is a request for someone to come closer to the speaker.

Yangkwurrangwa 'to here' also occurs with the suffix combination *-murru-wa* with the sense of 'on returning to this place'.[122] The English 'on the way back' reflects a different point of view, with the focus on the whole journey rather than the position of the speaker.

The adverbs *arrawa* 'inside, below', *errekba* 'outside' and *karrawara ~ abalkaya* 'above' all obligatorily take the suffix *-wa* 'to' when motion towards is intended.

123	*nalikenuma alikiri-langwa*	they came from the house
	nalikenuma arumu-langwa alikira	they came from the big house
	nalikenuma angabu-langwa alikira arumu-langwa ~ aruma	they came from that big house
	nalikenuma awilyabu-langwa alikira arumu-langwa ~ aruma	they came from one big house
	nalikenuma enungkwurakbu-langwa alikira arumu-langwa ~ aruma	they came from a big old house
124	*angambu-langwa angalya ningkilikarnuma*	what country do you come from?
	karnungwambu-langwa	where have you been?
125	*numulikajama erribaja diraka*	the truck is going away in the opposite direction
	numulikajama angerriba alikiru-wa diraka	the truck is going over there to the building
126	*Adinubawiya ningilikena Darwin-uwa kembirra yadikina ningilikena Sydney-uwa*	first I went to Darwin and from there I went to Sydney

2.4.3 MOTION FROM

a) The suffix *-langwa* 'from'

The suffix *-langwa* 'from' describes motion from objects, people and places. When a noun is qualified by an adjective, the suffix is attached to the adjective instead of to the noun, as is the case with the suffix *-manja* 'at, in, on, by' (see section 2.4.1).[123]

b) *Ngambu-langwa* 'from where?'

The interrogative 'from where?' is *ngambu-langwa*. It is sometimes used to initiate conversation, but less frequently than *ngambu-wa* 'to where?' (see section 2.4.2). Adjectival and pronominal prefixes may be added to *ngambu-langwa*.[124]

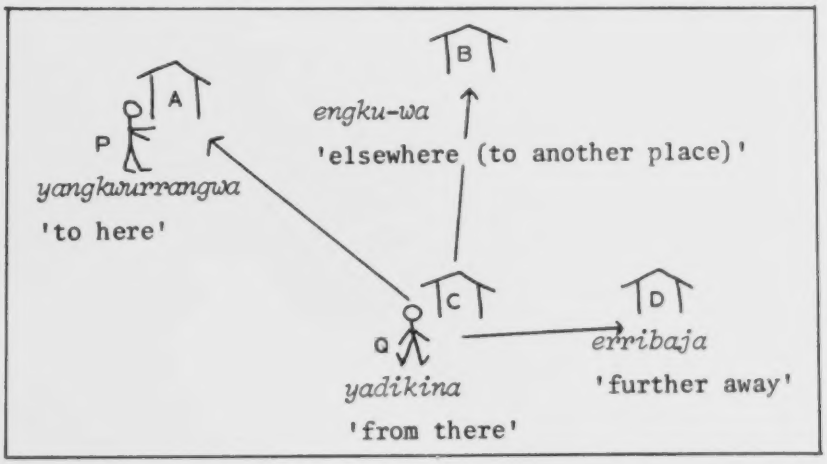
c) Adverbs indicating motion from

The adverb *erribaja* 'away' describes motion away from the speaker without reference to destination, as distinct from *angerriba* 'to there'.[125]

Erribaju-wiya is used as a command to move away from the speaker.

The adverb *yadikina* 'from there' describes motion of a person or an object away from a place which is distant from the speaker. The movement can be in any direction.[126] The adjective *eningi-yadikina* 'coming from there' also occurs.

127 *nenikaduwa nakina neningi-yadikina nungwarrka*
he.new he he.belonging-over.there father.my
'My father had just arrived from over there.'



In the above diagram, A, B, C and D represent places. P and Q represent people.

When Q goes away from C to D, P says:

yadikina nilikajama erribaja D-wa	He is going from there further away to D

When Q goes to B, P says:

yadikina nilikajama engku-wa B-wa	He is going from there to B

When Q comes to A, P says:

yadikina nilikajama yangkwurrangwa	He is coming here from there

The adverbs *arrawa* 'inside, below', *errekba* 'outside' and *karrawara abalkaya* 'above' all obligatorily take the suffix *-langwa* 'from' when motion from is intended.[127]

The diagram opposite illustrates three types of movement as expressed in Anindilyakwa.

128	*nijadanga arrawu-langwa*	he appeared from inside
	ngambu-langwa? Karrawari-langwa	where did it come from? from above
129	*nilikena mamurukwu-langwiya*	he went along the road
	nilikena mabulali-langwiya	he went through the shallow water (sea)
	numangkarrina karrawari-langwiya	it (the plane) flew high in the air
	marndekirriyerra numudirrirndama mamungwunyi-langwiya mamudangkwa	the yam went down through the soft sand
	ningilukwamurrkwaja aliki-langwiya	I followed the footprints
130	*nilikena mamurukwu-langwiya*	he went along the path
	nilikena miyukwujiya-langwiya mamurukwa	he went along the little path
	nilikena mangabu-langwiya mamurukwa miyukwujiya ~ miyukwujiyi-langwiya	he went along that little path
131	*kilikajama yada nara yadikina*	you will go this way, not that way
	yibilyubilya nilikena yadi-langwiya	the lightning came this way

ngaya memu-manja yadi-langwiya ngilikajama ningena ...
I this-on here-along let.me.go I

'Let me go along this (path), ...

nungkwaja makinu-manja mayuwarna yadikini-langwiya likaja
you.emph that-on follow.it there-along go

while you go along that one.'

2.4.4 MOTION ALONG A ROUTE

a) The suffix *-langwiya* 'along'

The suffix *-langwiya* describes motion along a route, whether that route is on the ground, through a tunnel, in the water or in the air.[128] It may be added to words which already imply motion in order to focus on the concept of 'along a route'.[129]

When a noun is qualified by an adjective, the suffix *-langwiya* 'along' is attached to the adjective instead of to the noun, as is the case with the suffix *-manja* 'at, in, on, by' (see section 2.4.1).[130] The numeral adjective is unlikely to occur.

b) *Ngambu-langwiya* 'along where?'

The interrogative 'along where?' is *ngambu-langwiya*. It is not as commonly used as *ngambu-wa* 'to where?' or *ngambu-langwa* 'from where?'.

c) Adverbs indicating motion along a route

The adverb *yada ~ yadi-langwiya* 'this way' describes a specific route straight ahead of the speaker. *Yadada* 'this way' occurs alone in answer to a question, and in indicating direction immediately ahead in the context of searching out a convenient path. *Yadikina* (literally 'from there') and *yadikini-langwiya* both mean 'that way'.[131]

Yada ~ yadi-langwiya 'along here' and *yadikina ~ yadikini-langwiya* 'along there' refer to the direction 'from elsewhere to here' as well as 'away from here'. The apparent confusion is probably connected with the fact that the verb stem *-likaja* means 'coming' as well as 'going'. In practice the context always clarifies the situation.

Yadi-langwa ~ yadi-langwu-langwa 'from this way' can also be translated 'this way' (see section 2.4.5).

132 *nilikarnu-manja yangkwurrangwa (angerriba) nirringka lukwakwa*
he.went-when to.here (to.there) he.it.*y*.saw on.the.way

yaraja
goanna

'He saw a goanna on the way here (there).'

yukwu-langwa aninga kalyubarini-yada lukwakwa — give me food to eat on the way

133 *likaja dirrbura ~ muwiyida memu-langwiya mamurukwa* — go straight ahead along this road

nerrikba malarra dirrbura ~ muwiyida yaraju-wa — he threw the stone straight at the goanna

kalikajama adalyuma dirrbura ~ awiyida angerriba awuruku-wa — the river goes straight ahead to the billabong

likaja dirrbura ~ ningkuwiyida angalyu-wa! — go straight home!

134 *numangkarrina arrawu-langwiya* — it (the plane) flew very low

135 *likaja yangkwurrangwa ~ kwa likaja yangkwurrangwa!* — come here!

kwa likaja ngayuwa-wa! — come to me!

likaja enuwa-wa ~ jaya likaja enuwa-wa! — go to him!

likaja angerriba ~ jaya likaja angerriba! — go over there!

136 *Perth-langwa ningkilikarnuma nungkuwa ambaka* — have you ever been to Perth?

ngambu-langwa? mijiyelyi-langwa — where have you been (to)? I've been to the beach

137 *ayukwujiya angalya nuw-akwudangwu-dina*
small place it.*a* -near-became

'A small village came near, i.e. they came near a small village.'

The adverb *lukwakwa* 'on the way' refers to any direction.[132]

The adverb *dirrbura* and the adjective *awiyida* 'straight' are used for the direction 'straight ahead'. *Dirrbura* is more common than *awiyida*. The direction is along a route but the position of the speaker is not involved and the end rather than the starting point is in focus. In English the concepts of direction and time are linked in the command, 'Go straight home', and the same connection is drawn in Anindilyakwa.[133]

The adverbs *arrawa* 'inside, below', *errekba* 'outside' and *karrawara abalkaya* 'above' all take the suffix *-langwiya* 'along'.[134]

2.4.5 'COME AND GO'

The verb root *-lik-* is a generic term meaning both 'come' and 'go'. It is connected with the noun *alika* 'foot'. Originally it must have meant 'walk'. It does not specify the direction, so this must be either added or implied from the context.

Kwa 'come' and *jaya ~ jayi ~ juyi* 'away' are used in conjunction with *-lik-*'go' and alone.[135] When *jayi* is used to conclude a conversation it may appear abrupt but is not impolite.

Sometimes *-langwa* 'from' in Anindilyakwa translates the English 'to'.[136]

Another contrast between the viewpoint of English and Anindilyakwa speakers is in the use of the adverb *akwudangwa* 'near' with the verbal suffix *-dina* 'become'.[137]

In a situation where a person is feeling his way from rock to rock across a stream he might ask *ngambu-langwa?* 'where from?'. An English speaker might say 'Where to next?' thinking of the direction to the opposite bank. The answer in Anindilyakwa might be *yadi-langwa ~ yadi-langwu-langwa* indicating the next step. In this case it would seem that the Anindilyakwa speaker is thinking of the route to be followed as coming from a certain direction rather than heading in that direction.

Do these examples illustrate an Aboriginal point of view in which paths lead towards the individual, and the world is seen as advancing towards him? Consider the situation before there were any made paths through the undergrowth. One might speculate that a

138	*mekbuda mada*	the right ear
	yekalyarra ~ yekawarriya yina	the left knee
	mekbuda mijiyanga	the starboard side of the boat, the boat on the right
	mekalyarra ~ mekawarriya mijiyanga	the port side of the boat, the boat on the left
139	*mekbudi-langwa mada*	on my right ear
	mekbudi-langwa mijiyanga	on the starboard side of the boat
140	*ningekalyarra ~ ningekawarriya*	the left side of my body
	ningekbuda	the right side of my body
	ningkekbuda ningkakina	you are right handed
	ningekbudi-langwa nakina	he is on my right
	ningekalyarri langwa ~ ningeka warriyi-langwa nakina	he is on my left
	nekbudi-langwa ningena	I am on his right
	dekbudi-langwa ningena	I am on her right
141	*likaja ningkekbudu-wa*	go to your right

person heading in a certain direction anticipates the best way forward as regards swamps, rocks and any other terrain that would impede progress. He can see the track immediately in front of him, although so ill-defined that the untrained eye may not discern it at all. He is interested in the unseen distance and the water, food or similar goal from which a track of some sort leads to himself.

2.4.6 LEFT AND RIGHT

The adjectives ***ekbuda*** 'right' and ***ekalyarra*** ~ ***ekawarriya*** 'left' are used with various parts of the body and also with non-human nouns and agree with the nouns they qualify.[138]

These adjectives with the suffix ***-langwa*** describe the positions 'on the right', 'on the left', and 'on the starboard side', 'on the port side'.[139] The suffix ***-manja*** 'on' cannot be used here.

Pronominal prefixes are added to ***ekbuda*** 'right' and ***ekalyarra*** ~ ***ekawarriya*** 'left' with reference to the whole of the right and left sides of the body. A person who is right-handed is described as using the right side of the body. This concept maintains the usual connection between right-handedness and right footedness.[140]

In English the directions 'to the right', 'to the left' are often impersonal. In Anindilyakwa they are always personal. 'Go to the right' must be translated 'Go to your right'.[141]

In addition to 'left' and 'right' there is an Anindilyakwa expression for 'one side' which refers particularly to trees, but which is associated with one side of the body. The prefix ***-ngamba-*** which represents the noun ***yingamba*** 'groin' occurs in the verb ***wu-ngamba-kbijangina,*** literally 'jump one side', i.e. climb up the tree, using hands and feet, and so clinging to one side of the tree.

2.4.7 FRONT AND BACK, EAST AND WEST

The term for the front of the body, ***angengkuwa,*** is connected with the verb stem ***-ngengkuwangina*** 'breathe'. The focal point of breathing is not taking air through the nose but the expansion and retraction of the chest. The expressions for the front or palm of the hand and the bottom or sole of the foot are compounds made from

142	*amungengkuwa ayarrka*	palm of the hand
	amungengkuwa alika	sole of the foot
	amurirrba ayarrka	the back of the hand
	amurirrba alika	the upper part of the foot
143	*warrijiya amarru-wa nara amudakbu-wa*	wind it forwards, not backwards

angengkuwa. The expressions for the back of the hand and the upper part of the foot are compounds made from *murirrba* 'back'.[142]

These words for 'front' and 'back' occur with reference to other upright things besides the human body. For example the pandanus palm leaf which is used for weaving has a distinct ridge along the back of the leaf. The back of the leaf is *mamurirrba* and the front of the leaf is *mamungengkuwa*.

'Front' and 'back' are more specific terms in Anindilyakwa than in English. The words primarily referring to the body are not applicable when describing position within a container. The position in the front of a canoe and a building is *amarru-manja* and the position in the back is *amudakbu-manja*. *Amarra* is not used alone, but *amudakba* is literally 'tail'. 'At the back' *akaburrangarna* ~ *akaburrangarnu-manja* is used for 'west' in contrast to *alyengmulyengma* 'east' which is literally 'at the front'.

The directions east and west are much more significant to Groote Eylandters in connection with land ownership than north and south. Terms for north and south are not in common use, but wind directions may be used.

'Forwards' and 'backwards' are expressed by the terms *amarru-wa* and *amudakbu-wa*.[143]

2.4.8 ORDERING OF POSITION

The ordering of place is limited to first and last. Like English, the words *ening-adinubawiya* 'first' and *enungw-arijilangwa* 'last' are adjectival. Unlike English, they are derived from adverbs of time. The middle ones, *eningu-wilyarra*, are not ordered (see section 2.2.4).

The verb *-lyeng-mena* 'lead' is used in various contexts. The literal meaning of this word is 'take the head'. The prefix representing *aringka* 'head' is *-lyang-* ~ *lyeng-* and the verb stem *-mena* is 'take'. The primary meaning of this word is to go first. When walking along a narrow path one person may say to another, *lyeng-mena nungkuwa* 'you go in front'. When various groups of people are travelling, the question may be asked, *angkaburra ka-lyeng-menama?* 'Who will go first?'. The word *-lyeng-mena* is also used as the equivalent of the English 'win' in the context of

144 *angkaburra na-lyeng-menama?* who is winning?

nakina ni-lyeng-manguma he won

wurrakina na-lyeng-manguma they've won

145 *ma-lyeng-ma-ji-na mema* put this (truck) in the front

146 *yimundungwa niyuwayinuma* the cypress trees were in a line

wulikaja wurriyuwayina! walk in line behind each other!

wurr-arnda-kilyangbadina! stand in line side by side!

147 *awilyaba-ma angalya akena angurrkw-ambilyuma*
one-emph area but enclosure-two

narri-ngurrkwarrngarnuma dirranda-ma
they.it.a-enclosed wire-with

'There was one cage, but they had divided it into two enclosures with wire netting.'

angalya na-ngurrkwarrnga-jungwunuma dirranda-ma the area was enclosed with wire

competition, either individual or team.[144] The same verb may be used with the addition of the causative suffix *-ji-*, as when instructing a child playing with toy trucks.[145]

There are various ways of describing things 'in a line'. For example the verb stem *-yuwayina* 'follow each other' can describe trees in a stationary position as well as people following each other. In the case of people standing in line side by side, the verb used to describe this position includes *arnda* 'elbow'.[146]

2.5 SPEED

Before the advent of modern technology, the concept of speed related to such things as the rate of movement of human beings on foot and of canoes, spears, fire, wind and water, animals, and the rate of growth of plant life. The skill of estimating speed, taking into account the natural forces which influence it, was and still is highly developed. Some examples have already been given in section 2.1 discussing estimation.

The basic terms relating to speed are *waranja* 'quickly' and *ambakilangwa* 'slowly'. The command 'Hurry up! Quickly' is *waranja!*

Waranju-bawiya also means 'quickly' but is used adverbially and includes the meaning of the English word 'early', as discussed in section 2.2.4.

Ambakilangwa has the extended meanings 'gently, carefully, little by little'.

The idiom *mekawajiya* 'make it (e.g. a bicycle) look good' is used with the meaning 'make it go fast'.

2.6 SPACE

The noun *angwurn.dikirra* 'space' is used for an area bounded on both sides by objects of any size. It is in common use for a strait, such as the strait between Groote Eylandt and Winchelsea Island. It is also used for the space between any objects such as rocks, houses etc., and refers especially to a narrow space.

The verb stem *-ngurrkwarrnga-jungwuna* 'be enclosed' is used to describe an area bounded on all sides by objects, making a confined space.[147]

148 *marri-jinungkwa numulikenuma* — it (road or vehicle) went straight on

yangungwa yarri-jinungkwa — an eel doesn't have legs

darri-jinungkwa dirija — a beltless dress or shift

alingabi-jinungkwa eka — a tree having a straight trunk without branches or protuberances

numungkurrbi-jinungkwa — a man who does not deviate to left or right, whose eyes are looking straight ahead

149 *mudirrbura mamurukwa* — a straight path

dirrbura warjiyinga! — stand up straight!

wu-dirrbura-kina akina eka! — straighten that stick!

mawiyidi-kina makina mamurukwa! — make that path straight!

wudirrburada! — stand up straight!

150 *makarda numamurrkwulinamurra* — the sea is calm (lies flat)

enungkwa namurrkwulinama ajiringku-manja — the spear is lying on the ground

enungkwa nuwalkayenama ajiringku-manja — the spear is standing upright

enungkwa nuwandilyinama eku-manja — the spear is leaning against the tree

mijiyanga numilankwalyilyaduma — the ship was leaning over

151 *aburrilangwa angalya nalawurradinama X-langwa*
their area it.a.returns X-from

'Their area goes as far as X.'

2.6.1 LINE SEGMENTS

In traditional Aboriginal society there was no need for arbitrary standards within spatial relationships. The concepts of lines and areas were only developed as far as they were needed, and in different ways from English. The following vocabulary items illustrate these concepts.

There is no Anindilyakwa word for 'a line', but there is a word to describe an object which has a straight line. The difference between a spear having a straight line and one with barbs, and between a tree with a straight trunk and one with branches, is significant. The concept of something having no obstruction is important and is therefore accounted for in the vocabulary. The concept 'without obstruction' is described by the root *-jinungkwa*. Prefixes must be added to elucidate precise meanings, some of which are listed. [148] (Another area of meaning was revealed when an old man with a bad cough was recording a story on tape for me. When I enquired about his cough he said *ningarri-jinungkwa*, meaning that he could keep on recording without stopping to cough.)

Two adjectives *adirrbura* and *awiyida* 'straight' describe the concept of straight lines whether horizontal or vertical. The adverbial forms are *dirrbura* and *awiyida*. The verb stems *-dirrbura-kina* and *-awiyidi-kina* 'straighten' are formed by adding the causative suffix *-kina* to these adverbs. The verb stem *-dirrbura-dina* 'become straight' is formed by adding the suffix *-dina* 'become' to the adverb *dirrbura* 'straight'.[149] However this suffix does not occur with *awiyida* which is not used as frequently as *dirrbura*.

Although there is no direct translation of 'horizontal', 'oblique' and 'vertical', the distinction between these positions is made by the verbs 'lying', 'leaning' and 'standing upright'.[150]

The noun *angurrkwuruwura* 'corner' which is connected with the adjective *ayangkwuruwura* 'crooked' is used to describe a curve such as the bend in a river or road, and a bay on the coast.

When English speakers discuss geographical areas, it is said that a certain area extends 'from here to there'. The Anindilyakwa speaker takes a different point of view, thinking of the direction in terms of 'from there to here',[151] as discussed in section 2.4.5.

152	*mamukwurra mamulerrbirra*	the point of a hooked spear
	amukwurra angalya	a point of land
153	*wungandingakina ena eka*	sharpen this stick (to a point)
154	*nara ar.darruma menba yimendi-langwa*	don't poke your finger in the turtle's eye
155	*aremberrbirra eka*	a board (flat piece of wood)
	yangungwu-langwa mamudakba muremberrbirra	an eel's tail is flat

2.6.2 POINTS

There is no Anindilyakwa word for the mark made by a pointed object, but the word ***amukwurra*** 'face' is used for the point of something sharp like a spear, and therefore also a pencil. The same word is used for a point of land.[152] The action of making something pointed is much more significant than the concept of a point as such. Spears and digging sticks have to be sharpened to a point.[153]

The action of poking with the finger at a point is described by the verb ***-ar.dirrena*** 'spear'.[154] It should be noted that an Anindilyakwa speaker does not use the finger to point. Instead he indicates a particular direction with movement of the chin and lips.

2.6.3 ANGLES

The noun ***angurrkwuruwura*** 'corner', already mentioned with the meaning of a curve, refers also to all sharp angles. The context elucidates whether the angle is a right-angle, acute or obtuse, since traditional Aboriginal culture was not concerned with abstractions out of context.

2.6.4 SHAPE

a) Planes

Aremberrbirra 'flat'

The adjective ***aremberrbirra*** 'flat' describes any flat object, such as a gramophone record, a slab of rock, and paper and books.[155]

Rectangular, square

Pieces of bark for bark paintings are roughly rectangular when cut from the tree and left without trimming. Sails for canoes are the same rectangular shape. Before the introduction of ready-made cloth they were made without regard to the preciseness of the angles or the exact length of the sides.

Angarumungkwa 'concave'

The adjective ***angarumungkwa*** 'concave' describes an object which is shallow and only slightly concave, such as a saucer, and also deeper containers such as a bark coolamon, a boiler (for cooking),

156 *na-mungeki-lyuwakenama aringka enilangwa*
it-head-circles head his

'His head is spinning, he's giddy.'

akungwa nuw-aburringki-lyuwakenama nerrikbinumurru-manja malarra
water it-liquid-circles he.threw-at stone

'The water is going around in circles where he threw the stone.'

n-aburringki-lyuwaka-juwa diya
he-liquid-circle-cause tea

'He stirred the tea.'

ni-ringki-lyuwaka-juwa alikira
he-house-circle-caused house

'He went right around the house.'

ni-riki-lyuwaka-jungwunuma
he-foot-circle-reflexive

'He's going around and around in circles.'

yingarna ni-rreki-lyuwaka-jungwunuma
snake it-coiled.thing-circle-reflexive

'The snake has curled itself up.'

a copper (for washing) and a Macassan cooking pot. The same word applies to the deeply concave hull of a ship. The perimeter of these containers may be either circular or elliptical.

The notion of planes being convex is irrelevant to the Anindilyakwa speaker because it does not have any practical implications, being no more than a description of things concave seen from a different aspect. A roof is only of interest as a covering above people. However, see section 2.5.4 for a discussion of solids which are convex.

The absence of an Anindilyakwa one-to-one correspondence with the English word 'horizon' does not prevent an Anindilyakwa speaker from talking about land and boats on the horizon. The Anindilyakwa speaker talks about them being so far away that one can hardly see them.

Circular

The word ***amamuwa*** 'elliptical object, small round object' is also used for a circle drawn on bark. The precise differentiation between circular and elliptical in either case is irrelevant, and the differentiation between planes and solids is obvious in context.

When objects are arranged 'in a circle' the abstract noun 'circle' is used in English to designate a more or less exact shape. In Anindilyakwa a description is given in concrete terms of the objects forming the shape, but the shape is unnamed. The objects forming the shape are in focus, instead of the shape itself. The space created by those objects is also significant. In example 144 describing an enclosed space, the actual shape of the enclosed area could in fact be circular.

The verb stems ***-lyuwakena*** 'circle', ***-lyuwaka-jina*** 'encircle' and ***-lyuwaka-jungwuna*** 'form a circle' require a prefix representing a noun in addition to pronominal prefixation. They are in common use and occur idiomatically as well as literally.[156] It should be noted that movement is always involved.

157	*amamuwa ayarrka*	finger (hand)
	amamuwa alika	toe (foot)
	mamamuwa menba	eye ball (eye)
	am-amamuwa aninga	fruit
158	*yinumamuwa*	eggs, particularly of *y* noun class creatures e.g. *yimenda* 'turtle'
	dadumamuwa	eggs of *d* noun class creature e.g. *dingarrbiya* 'crocodile'
159	*am-amamuwa duja*	battery (torch)
	am-amamuwa awarnda	coin (money)
	am-amamuwa jinaba	bullet (gun)
	am-amamuwa mirrijina	tablet (medicine)
	mam-amamuwa	marble
160	*m-embirrk-ambawura muninga*	a few cycad nuts
	yimawura y-embirrk-aruma	the full moon (literally 'big')
161	*yi-mungk-ababurna yinumukwena*	many heaps of cockles
	ma-mungk-ambilyuma murungkwurra	two heaps of round yams
162	*ni-rak-uwurra bajikala*	he threw the tin away
	jinaba ni-rak-uwilyakama	he was carrying a gun
	a-rak-adirrungwarna dudija	a length of big pipe

b) Solids

Round, ovoid

The word *amamuwa* 'small elliptical object, sphere' was probably first used to describe fingers and toes and then extended to include other body parts, eggs and certain parts of plants. Various buds, fruits and pods are described as *am-amamuwa*.[157]

The secondary meaning of *amamuwa* includes any small round object. The focus is on the spherical mass rather than the exact shape. Most eggs are oval, but the most sought after eggs are the round ones belonging to *yimenda* 'turtle'. Because turtle eggs are an important source of food it seems that *yinumamuwa* is used generally for any kind of egg, unless specifically stated.[158]

Many introduced objects are called *amamuwa* and *mamamuwa*. The exact meaning is made clear by the context.[159]

The fact that *amamuwa* can refer to both round and ovoid objects does not mean that a more precise definition of round is unavailable, when needed, although it is not used by children.

The prefix *-embirr-* represents the noun *andira* 'kidney' and also means 'round'. It is used by adults to describe such round things as introduced objects, pebbles, fruits, eggs and the round sting-ray.[160]

By using prefixes describing particular characteristics, one can distinguish between round and ovoid eggs. The noun *amamuwa* 'small elliptical object' can take the prefix *-embirr-* 'round', with the appropriate noun class marker, to form a compound word. Thus *y-embirr-k-amamuwa yimendi-langwa* 'the round egg of the turtle'. The same prefix *-embirr-* 'round' added to the adjective root *-jirrirra-* 'long' produces a new adjective, 'ovoid', to describe the hen's egg *d-embirr-i-jirrirra dadumamuwa jukwujukwu-langwa*.

The prefix *-mungk-* is used by adults for a collection of round things such as eggs, bush food, shellfish and round rays.[161]

The prefix *-rak-* representing the noun *yiraka* 'didjeridu' is used by adults to describe all round, hollow objects, such as bottles, tins, pipes, drums etc.[162]

163	*ningenum-ebinga*	by body (trunk only)
	dadum-ebinga	her body, body of crocodile etc.
	yinum-ebinga	body of bandicoot, wallaby etc.
	nenum-ebinga	his body
	warnum-ebinga	body of baby, dog etc.
164	*mamungina maliliyanga*	nuts of the stringybark
	yinumungina yinubarringinja	nuts of the white gum
165	*a...yukwujiya ~ ayu...kwujiya*$_1$	tiny (see Appendix 1)
	ayukwujiye-ka	very small
	awank-iyukwujiya	small
	awank-ayukwujiya	rather small
	awank-aruma ~ awank-adirrungwarna	rather big
	aruma ~ adirrungwarna	big
	arume-ka ~ adirrungwarne-ka	very big
	awank-amakwulyumuda	rather huge
	amakwulyumuda	huge
	amakwulyumude-ka	enormous
166	*ena awarnda awank-iyukwujiya umba akina ayukwujiya*	this stone is rather small but that one is (really) small

167 *wulalika ayukwayuwa-wiya umba wumiya ena arumu-dangwa*
leave small-plural but pick.up this big-emphasis

'Leave the small ones and pick up this big one.'

Ebinga 'body shape, ant-hill'

Ebinga 'ant-hill' is so called because of its likeness to the human body — ***ningenum-ebinga*** 'my body' describes the human body in the way that 'trunk' is used in English. With reference to human beings ***ebinga*** usually describes a large, thick-set body. With reference to animals, it describes those having a relatively large, solid body, such as the dog and bandicoot.[163]

Amungina 'knob'

The word ***amungina*** is used for a 'knob'. It is used for the small bones such as knuckles, wrist bones and ankle bones, and for the joints of the fingers and toes. By extension of meaning it describes certain parts of plants having a similar appearance. The seed pods of plants and gumnuts are likened to these small bones.[164]

Convex

The concept 'convex' as applied to solids is described by the verb ***-dirralinga*** 'heaped up'. The scrub hen piles up a large heap of leaves and earth for a nest in which to place its eggs to incubate them. This pile is ***na-dirralinga*** 'heaped up'. A tree having lumps which protrude from the trunk is ***alinga-dirralinga*** 'tall and lumpy'. See the description of thickness in section 2.7.2.

2.7 SIZE

The basic concept of size is expressed in three ways: ***ayukwujiya*** 'small', ***aruma*** ~ ***adirrungwarna*** 'big' and ***amakwulyumuda*** 'huge'.

In the ordering of size the prefix ***awank-*** 'rather' and the emphatic suffix ***-ka*** occur.[165] Comparison of size is expressed as indicated when discussing inequality, using ***angwurra*** 'more', ***awank-*** 'rather' and the emphatic suffix ***-ka*** (see section 1.2.4).[166]

The emphatic suffix ***-dangwa*** occurs and singles out one from a group, e.g. ***arumu-dangwa*** 'the big one' and ***ayukwujiyi-dangwa*** 'the small one'.[167]

168

arukwudarrbe-ka	very short
awanki-rukwudarrba	rather short
arukwudarrba	short
awank-amurajirrirra	rather high, rather long
amurajirrirra	high, long
amurajirrirre-ka	very high, very long

2.7.1 HEIGHT, LENGTH AND DEPTH

The basic concepts of height and length are expressed by the same words *amurajirrirra* ~ *amurajirra* 'tall, long', and *arukwudarrba* ~ *adarrba* 'short'. In the past there was no need to differentiate between vertical and horizontal.

The adjective *adarrba* 'short' can occur alone but more frequently occurs with a prefix representing a noun. When the prefix *-ruk-* ~ *-rukw-* representing the noun *alika* 'foot' is added to *adarrba* 'short', the word *a-rukwu-darrba* is formed and used as an alternative for short in many contexts.

Depth is expressed by *angwujirira* ~ *angwujira* 'deep' and *abulala* 'shallow'.

The ordering of the concepts of height and length is listed opposite.[168] The concept of depth can be similarly ordered. The emphatic suffix *-dangwa* can be used to single out 'the long one'.

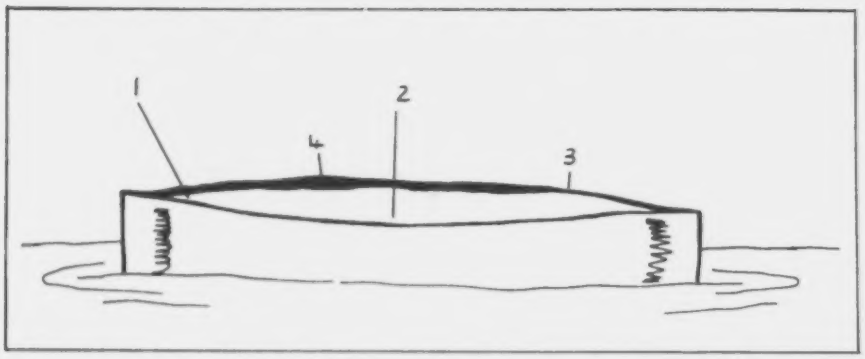
Comparison of these concepts is expressed as indicated when discussing inequality (see section 1.2.4).

2.7.2 THICKNESS AND WIDTH

There are various words in Anindilyakwa to describe the English terms 'fat' and 'thin', 'thick' and thin', and 'wide' and 'narrow'.

The adjectives *engmurra* 'fat' and *ayarrmiyarrma* ~ *alarrkbulala* 'thin' qualify people, animals and also certain inanimate objects. Ordering and comparison are possible as indicated for height but are not generally used. The suffix *-dangwa* singles out one from a group.

Other words for thickness and width are complicated by the fact that the root cannot be used without a specific prefix representing a noun as well as the usual noun class marker. (See Appendix 2 regarding noun prefixation.)



169 *alinga-dirralinga eka*
tall-lumpy tree

'a tree with a protruding lump'

alinga-jamiyama eka
tall-thin tree ~ stick

'a tall thin tree ~ a long thin stick'

mirre-jamiyama merra
long.flexible-thin string

'a coil of thin string'

mungak-adirrungwarna makarda
thigh.shape-big sea

'rolling waves'

arra-jirrirra amukwurra
forehead.shape-long face

'a long peninsula'

170

amukwurra awank-arra-jirrirra	a fairly long peninsula
amukwurra arra-jirrirre-ka	a very long peninsula
amukwurra arra-jirrirri-dangwa	the very long peninsula

The following adjective roots occur:

-dilidila	fat, thick (people, animals and things)
-biyiya	fat, thick (people, animals and things)
-dirralinga	thick (things), literally 'heaped, piled up', also 'lumpy'
-jamiyama	thin, narrow (people, animals and things)
-kijuba	thin, narrow (things)
ebirra	wide (things)

The root *-kijuba* is not in common use among young people.

The root *-dirralinga* 'thick' has been discussed with reference to convex solids (see section 2.5.4).

The root *-ebirra* 'wide' also means 'spacious', 'roomy'. In this case width is not the only component of meaning.

The diagram opposite of a canoe illustrates four of the above terms. The prefix representing *malamukwa* 'canoe' is *-amba-* 'container' and that representing *eka* 'tree ~ wood' is *-arnda-*. *Malamukwa* 'canoe' is in the *m* noun class, and *eka* 'tree' is in the *a* noun class, but in this example 'thin wood' has the *m* noun class marker because the wood is part of the canoe.

1. *mamba-kijuba ~ mamba-jamiyama*	'narrow canoe ~ narrow part of canoe'
2. *mamb-ebirra*	'wide canoe ~ wide part of canoe'
3. *marnda-kijuba ~ marnda-jamiyama*	'thin wood (edge of canoe)'
4. *marnda-dilidila ~ marndak-biyiya*	'thick wood (edge of canoe)'

2.7.3 COMBINED CONCEPTS

Anindilyakwa has the potential for describing a combination of two concepts in one word. A few examples will suffice to show the remarkable flexibility of the language.[169] The prefix *awank-* 'rather' and the suffixes *-ka* 'very' and *-dangwa* 'emphasis' can occur.[170]

171 *angwura alyikarrbarubara*
firewood light.and.hollow

'firewood that is light to carry because hollow, and so useless'

angwala alyikarrbarubara
crab light.and.hollow

'crabs that are not worth catching because they feel light, which indicates very little flesh inside the shell'

dilyikarrbarubara dadiyuwangkwa
light.and.hollow old.woman

'an old woman who has lost weight from not eating and is therefore light to carry'

172 *awilyaba bajikala na-lyang-burrukwunama*
one tin it.a-head-disappears

'One tin is full.'

ni-lyangburrukwa bajikala yilyakwa
it.y-filled tin honey

'The tin is full of honey.'

numi-lyangburrukwa bajikala mangkarrkba arakba
it.m-filled tin plums now

'The tin is full of plums now.'

wi-lyangburrukwajina bajikala mamudangku-murra
it.a-fill tin sand-with

'Fill the tin with sand!'

yinguma-lyangburrukwajuwa mamudangkwa bajikalu-manja
she.it.m-filled sand tin-in

'She filled the tin with sand.'

173 *nara ambaka aladuma* I haven't had enough to eat yet

alyubarina kiladeni-yada
eat you.will.be.full-purpose

'Eat so you will not be hungry.'

2.8 MASS

The basic words describing mass are ***engkubarrngwarrngwa*** 'heavy' and ***ekilyarrba*** 'light'.

The concepts of size and mass are not connected. Objects may be small and heavy or large and light. There is a special word ***alyikarrbarubara*** for things that are sometimes big but hollow and therefore light.[171]

The ordering and comparison of the terms 'heavy' and 'light' follow the same pattern as that for height (see section 2.7.1).

2.9 CAPACITY

Before the era of technology, baler shells were used to hold water, and containers made of bark were made by the women for the daily gathering of food. They were also useful for holding objects such as ochres. These containers were made from stringybark (Levitt 1981:18). Paperbark is still used as a temporary container when other containers are not available. This is not carefully made into a container like those from stringybark, as it is soon discarded.

As in English the concept of fullness refers to both liquids and solids. A container is full when the contents reach the top, so the adjective ***alyang-burrukwa*** 'full' is evidently connected with ***-lyang-***, the prefix representing ***aringka*** 'head'. It is feasible that the root ***-burrukw-*** has some connection with the verb stem ***-lyikarr-burrukwuna*** meaning 'slip and fall over' and thus in some situations 'disappear from sight'. The inside of the container disappears as far as the top, or head, when full.

The verb stem ***-lyang-burrukwuna*** 'be filled', 'be full' refers to the contents and also to the container. The causative ***-lyang-burrukwa-jina*** 'fill' also refers to both contents and container.[172]

Capacity with reference to eating is described by the verb stem ***-ladena*** 'be replete'.[173] This word is also used to refer to a full bladder. When a person has had enough to eat and is offered something more, instead of refusing the food the expression ***ngawa*** 'enough' is used, being the equivalent of 'no thank you, I've had enough'.

174 *kalyangburrukwuna bajikala (ayarrka) akwa kakwarringina*
it.a.will.be.filled tin (hand) and it.a.will.break.in.two
'a tinful (handful) and a half'

175

mabun-debirra makarda	empty sea e.g. devoid of fish
murn.-debirra medirra	empty cave e.g. without any paintings
arndi-debirra eka	an empty tree e.g. without fruit or wild honey
marndi-debirra mangkarrkba	empty plum tree
mamba-debirra malamukwa	empty canoe
mal.debirra miyerriya	empty nest
ama-debirra angalya	empty camp

176 *narrumalarrkarnu-manja mamulerrbirra angerriba ayangkwulyumuda-wa nuwarrangbina awarnda yakwujina*
when they sent hooked spears across to the mainland they got stone from there

177

am-alyukwurra	paper money (from *alyukwurra* 'paperbark')
amu-jurra	paper money (from *jurra* 'paper')
am-amamuwa	coinage (from *amamuwa* 'small round objects')
ambarrngarna awarnda?	how much money?
aruma awarnda	a lot of money

The concept 'half full' in Anindilyakwa is not exactly half but 'partly full'. The adjective *ekwarra* 'one part' is used to describe a partly filled container but reference is made to the contents and not to the container itself (see section 1.2.3). The amounts 'a tin and a half' and 'a handful and a half' are expressed idiomatically by verbs.[174]

The concept 'empty' is described by the root *-debirra* which requires a prefix representing a noun. The concept has a wider area of meaning than the English. The use of the word focuses on the absence of what one might expect to find according to the context.[175]

2.10 MONEY

Before the introduction of money, trading took place between the people of Groote Eylandt and the mainland tribes. Locally made hooked spears were traded on the mainland in exchange for a particular type of sharp stone used for spear heads[176] and also for a type of red ochre which was considered superior to the red ochre available on Groote Eylandt. Trading also took place between the clans on Groote Eylandt itself. Certain kinds of wood required for particular purposes were traded between the clans on Groote because the supply was greater in some clan areas than other. The Wurramarrba clan, for instance, traded rope for hardwood which abounded in the Jaragba clan territory.

The term used for buying and selling is a transliteration of the English, and there is no clear differentiation between the two types of transaction. When both 'buy' and 'pay' are transliterated, the result is the same, since both words in Anindilyakwa become the one form *-bayindena*. However the context usually clarifies the meaning adequately.

Today two words are used for money. One is *mani*, transliterated from the English 'money', and the other is *awarnda*, literally 'stones'. Although *awarnda* is a general term for sums of money, it refers more specifically to coinage. The examples show other adaptations that have been made for modern needs.[177]

2.11 AGE

The concept of precise age was not recognised in traditional Aboriginal society. Although years were not counted in any way, people's ages were compared. Stages of development in small children were

178 *dangariya* baby girl, toddler, infant

dadiyara young unmarried girl

didarringka female, woman, married woman

dadiyuwangkwa old woman

noted and compared with much interest, and this is still so today.

Some 'age' terminology in Anindilyakwa is beyond the scope of this paper because the focus of such terminology is not on age but on marital status, parenthood, and ritual stages for men. For this reason such terminology is not parallel for both sexes. A few basic examples are given opposite.[178]

The comparative age of children is less important than their size. In a group of young boys to be circumcised, age might vary more than size. More is expected of bigger boys than of others of the same age. Those children who are big for their age may have a hard time, while their contemporaries are let off lightly. When the ages of two boys are compared, there may be little difference between their dates of birth, but one boy is said to be *naruma* 'the big one' (older), and the other is *niyukwujiya* 'the small one' (younger). Exact ages are irrelevant.

When a new baby is talked about in a small community, the age is obviously not in focus but the sex is of great importance. Thus the answer to the question,'Is the baby a boy or a girl?' is often *nenungkwarba* 'male, man' or *didarringka* 'female, woman'. The adjective *amurrkbalya* 'soft' is also used for very young babies.

In a family the first born child is *numilyengma* or *nenungwur.dangmanja* if male, and *dumilyengma* or *dadungwur.dangmanja* if female. The last born child is *nenungwarijilangwa* or *nenikubarukwena* (male) and *dadungwarijilangwa* or *dadikubarukwena* (female). Every boy in the middle of the family is *neninguwilyarra,* and every girl is *dadinguwilyarra.*

Wurriyukwayuwa, the human plural form of the adjective 'small', has the special meaning 'children' when it is used alone but other pronominal prefixes can occur, e.g. *kirriyukwayuwa* 'you children'. The plural form with reduplication *wurriyukiyukwayuwa* is also used.

Wurrarumuruma, the human plural form of the adjective 'big' with partial reduplication, has the special meaning 'adults' when it is used alone, but the exact meaning depends on the context in which it is used. As well as meaning adults as opposed to children, it means older, more mature adults as opposed to young adults, and it is also used for ancestors. Another way of referring to ancestors is to use the term *wurrumurumurena* 'grand-fathers' with the adjective *warninungkwurakba* 'old'. By analogy the same term

179 *narumuda erriberribu-manja* — he grew up in the bush

180 *yingin-arumurrkama diyabadikbu-langwa nangariya* — she brought up her older sister's baby boy

181 *kamakinama alawudawarra enungkwurakba* — I will tell you an old story

ena alikira enikaduwa umba angaba enungkwurakba — this is a new house but the one over there is old

wurrumurumurena with its reciprocal meaning 'grand-children' can be used with the adjective *warninikaduwa* 'new' to mean 'descendants'.

Age, size and importance of people are closely linked. *Niyukwujiya* means 'small, young and unimportant' (masculine). *Naruma ~ nadirrungwarna* means 'big, old and important' (masculine). The word *wurrarumuruma* 'adults' thus carries the further meaning 'important people'.

The verb stem *-arumudina* 'become big' has the extended meaning 'grow up'.[179] The causative verb stem *-arumurrkina* 'make big' translates the English 'rear, bring up'.[180]

The terms for the age of <u>things</u> are *enikaduwa* 'new' and *enungkwurakba* 'old'.[181] See examples 75 and 127 for figurative uses of these words.

3. CONCLUSION

The foregoing description of Anindilyakwa concepts demonstrates that there is a wide variety of constructions to describe the basic concepts of beginning mathematics. Some terminology referring to these concepts is not inadequate, but it is unsuitable for young children because it involves sophisticated and complex language forms. The complexity of these forms shows the richness of the concepts in the language.

Adaptation has been taking place already in some of these areas and further adaptation and extension are foreseen.

APPENDIX 1

EXTENDED VOWELS AND CONSONANTS

Either a vowel or a consonant, if the consonant is a continuant, e.g. *m, n, r,* may be lengthened. This phenomenon is common in Australian Aboriginal languages. In Anindilyakwa it signals emphasis in adjectives and adverbs. It usually occurs in the first or second syllable of the word. It also occurs in the conjunction *biya* 'and then' signalling an interval of time. The tone is high on the first syllable and falling gradually throughout the word. This feature is symbolised by the insertion of a few dots in the extended syllable.

am...bakilangwa	very slowly
a...rakbawiya ~ *ar...akbawiya*	very long ago
a...yukwujiya ~ *ayu...kwujiya*	very small
e...ningaba ~ *en...ingaba*	very good
akwu...dangwa	very close
bi...ya	and then, after a while

APPENDIX 2

NOUN PREFIXATION

Noun prefixation describes a phenomenon that is possibly more extensive in Anindilyakwa than in many other Australian Aboriginal languages. Many nouns can be represented by a specific prefix as well as having a free form. The prefix which cannot be used alone is usually quite different from the free form, e.g.

aringka	'head' (free form)	*mamurukwa*	'road' (free form)
-lyang-	'head' (prefix)	*-lukw-*	'road' (prefix)

Noun prefixes occur in adjectives following the noun class marker. They are sometimes obligatory and sometimes optional, e.g.

a-lyang-mandukwuna (obligatory)
class.marker-head-true

'true, honest'

m-abiyakarbiya	*mamurukwa* ~	*mu-lukw-abiyakarbiya*	*mamurukwa*
class.marker-three	road	class.marker-road-three	road
'three roads'		'three roads'	

Noun prefixes also occur in verbs following the subject + object pronominal prefixation. They are sometimes obligatory and sometimes optional, e.g.

ning-eni-lyang-barra (obligatory)
I-him-head-hit

'I hit him on the head.'

ningi-lalika	*amurndakijika* ~	*ningi-larrngki-lalika*	*amurndakijika*
I-left	things	I-things-left	things
'I left the things.'		'I left the things.'	

Nouns having a specific prefix as well as a free form include body parts, common nouns, generic terms and topographical features.

In some cases there is a prefix without a corresponding free form, as in the terminology describing shape, e.g.

yibilyubilya numindenama ~	*yibilyubilya ni-ngarning-mindenama*
lightning it.*y*.shines	lightning it.*y*-long.rigid-shines
'the lightning shines'	'the forked lightning shines'

ABBREVIATIONS

emph	emphasis
excl	exclusive
fem	feminine
incl	inclusive
masc	masculine
sing	singular
plur	plural
~	alternating with
-	separating morphemes in Anindilyakwa and in English examples
.	separating English words

ACKNOWLEDGEMENTS

I would like to express my appreciation to all Groote Eylandt Aborigines who have patiently taught me over the years and still continue to do so.

Since my first few handwritten pages in 1968 I have been encouraged by various people to pursue this study and I am grateful for their interest and support. I would like to thank three people in particular who have helped with editing successive drafts. Firstly Lois Reid, who taught in the Angurugu School for nine years, whom I consulted during the early stages and who helped with editing and typing the 1976 draft. Secondly John Harris who was principal of the Angurugu School during 1977 and 1978 and offered helpful comments and also arranged for the typing of a later draft. Thirdly Julie Waddy, ethnobiologist at Angurugu, to whom I am indebted for her co-operation in seeing the paper through the final stages of editing. Lastly the pre-publication typing was patiently done by Christine Ward.

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Work Papers of SIL-AAB
Series B Volume 8
December 1982

FACTS AND FALLACIES OF ABORIGINAL NUMBER SYSTEMS[1]

John Harris

0. INTRODUCTION

'ugg uggugg ugguggugg uggugguggugg'

Thus, suggests Trewin (1971:36), primitive man may have first counted. In his book for teaching mathematics in Australian schools, Trewin then proceeds not only to suggest that children should 'invent a primitive man's set of number names', but also that they should specifically apply this suggestion to 'present day primitive tribes, e.g. Australian Aboriginals'. This view, that associates Aboriginals with so-called 'primitive' number systems, is widespread, founded not on fact but on misconceptions about the nature of human cognition held by generations of white Australians and perpetuated in the literature and therefore by those who teach. The sequence of events which has led to the retention of these misconceptions in the literature can be set out as follows:

1. Late in the eighteenth century and early in the nineteenth century, the first lists of words in Australian Aboriginal languages became generally available to the scholarly world in travelers' tales, in diaries and in papers presented to learned societies. These very haphazard lists, often of purely random words, tended, if they included any reference to numbers at all, to list only those words supposed to be the Aboriginal equivalents of one, two and three.

2. Early anthropologists, such as Tylor, took these lists at face value and saw in them the evidence they were seeking of the

cognitive inferiority of 'the lowest of living men' (Tylor 1871:242). A similar point of view was adopted by a number of writers last century who gathered information on Aboriginal people from various sources (e.g. Mathew 1899). Among the more substantial of these publications was Curr's four-volume compilation in 1886. Crawfurd, in his influential paper in 1863, actually used numbers as indicators of 'progress in civilization', the Aboriginal numbers being 'examples of the rudest numerals of the lowest savages of which we have any knowledge' (Crawfurd 1863:102).

3. Significant mathematical historians such as Conant (1896), Smith (1923) and Dantzig (1930) quoted the earlier anthropological data as examples of primitive mathematics. Dantzig, for example, used Curr while Smith used Tylor and Crawfurd. Their books became standard texts, regularly republished as recently as the 1950s and 1960s.

4. Mathematics educators such as Taylor and Mills (1955), Swain and Nichols (1965), Jones (1969) and Polis and Beard (1973), writing materials for the training of mathematics teachers, continue to cite Australian Aboriginal number systems as examples *par excellence* of the 'inept' counting abilities of 'backward' people (Swain and Nichols 1965:1). The illustrations they provide are drawn from the standard texts on the history of mathematics. Taylor and Mills cite Conant, as does Jones, while Swain and Nichols cite both Dantzig and Smith.

5. Classroom teachers and those who write materials for classroom use, such as Trewin (1971), having absorbed this information, pass it on to their students and thus the misconceptions continue to be perpetuated.

Regrettably, the situation has not been helped by a number of modern linguists. Although they are not necessarily guilty of the kind of social Darwinism which sees the degree of cultural evolution reflected in number systems, they nevertheless make unqualified statements concerning Aboriginal number systems which are misleading in their simplicity, if not demonstrably incorrect. In this regard, Blake 1981 is of particular concern because it is intended for the general public. (See quotation from Blake in section 1.1.)

With respect to number systems, there are three distinct but interrelated misconceptions. The first is the belief that no Aboriginal languages have number words which extend beyond two or three; the second is the belief that these words mark the limits to counting; and the third is the belief that the absence of extended number systems indicates some kind of cognitive inadequacy. These three misconceptions will be treated separately.

1. ABORIGINAL NUMBER SYSTEMS

1.1 RETHINKING TRADITIONAL MISCONCEPTIONS IN THE LITERATURE

There are a significant number of Aboriginal languages in which the number words extend beyond the limits which are normally claimed in the literature. The most frequently encountered statement is that numbers above three are lacking in most Australian languages:

Spencer and Gillen 1899:25
O'Grady et al. 1966:133
Wurm 1972:63
Vaszolyi 1975:8
P. Harris 1980:13

or in all Australian languages:

Holmer 1963:14
Abbie 1969:167
Von Brandenstein 1970:13

Other frequently stated limits are the numbers four or five:

Tylor 1871:242
Porteus 1931:306
Montagu 1969:215
King-Boyes 1977:41
Ellegard 1981:99
Blake 1981:4

or the number two:

Crawfurd 1863:170-81
Hallpike 1979:243
Dixon 1980:107-8

or even the lack of any numbers at all: deLemos 1966:85.

The real situation is that there is considerable variation in Aboriginal number systems; that whereas some systems may appear to have only two, three or four of what Wurm terms 'monomorphemically signalled numerals' (1972:63), many have words for five and for ten, while some have words for higher numbers, examples of which will be discussed later in this paper. In the light of the data available last century, some of the earliest generalisations concerning the limits of Aboriginal number systems are, if not pardonable, at least explainable. It is, however, becoming increasingly difficult to understand why these misleading generalisations should continue

to be made, particularly by competent and noted linguists. The following quotations are some of the more recent examples:

> . . . **nor is their counting comparable to our elaborate numerical system. Indeed, it never exceeds 3 . . .** (Von Brandenstein 1970:13).

> **The one obvious gap in Australian vocabularies is the lack of any system of numbers. It is usually said that there are only numbers 'one', 'two', 'several' and 'many'; some languages appear also to have 'three', although this is frequently a compound form.** (Dixon 1980:107-8).

> **No Australian Aboriginal language has a word for a number higher than four.** (Blake 1981:3-4).

These statements should not be left unchallenged. Before examining the reasons why such statements continue to be made, it must be shown that some Australian Aboriginal languages do have words for numbers higher than two or four. The three examples in Table 1 have been purposely selected from literature spanning a century of reporting in order to emphasise the long-term availability of this data.

Table 1. Examples drawn from the literature on Aboriginal languages with number names greater than four[2]

Language:	Kokata	Anindilyakwa	Tiwi
Locality:	western S.A.	Groote Eylandt, N.T.	Bathurst and Melville Island, N.T.
Literature Source:	Taplin 1879:97	Tindale 1925:128	Osborne 1974:passim
one	*kuma*	*auliaba*	*natinga*
two	*kutthara*	*ambilima*	*jirara*
three	*kabu*	*abiakalpia*	*jiraterima*
four	*wima*	*abuiabua*	*jatapinti*
five	*ngerla*	*amukugle*	*pungiringita*
ten		*amambaruku*	*wamutirara*
fifteen		*amabwukuale*	
twenty		*ogripulung*	

There are numerous other word lists showing Aboriginal words for five or ten (e.g. Spencer 1914, Tryon 1970, Hughes 1971, Chadwick 1975); some general references to such words (e.g. Tyler 1871, Capell 1958, Wurm 1972, Hale 1975, Tindale 1978); and even a few references to 'regular quinary systems of numerals which seem to extend indefinitely upward' (Wurm 1972:64, Capell 1958:27). In other words, unqualified claims such as Blake's statement that no Aboriginal languages have words for numbers above four are, in fact, false.

Why do Dixon, Blake and others continue to ignore this information? Although, as Tindale pointed out (1978:158), there is a surprising lack of attention to number in the literature on Aboriginal language and culture, the dearth of information is not such that serious scholars could be unacquainted with it. Indeed, Dixon refers to a statement by Hale found in a paragraph in which Hale also refers to the Gunwinggu conventions for five, ten and fifteen (Dixon 1980:108; Hale 1975:295). The possibility, therefore, that these scholars are unaware of Aboriginal languages with numbers greater than two or four must be dismissed, and it can only be presumed that they have consciously avoided reference to them. It would be unfortunate indeed if these numbers were known about but considered too insignificant to mention. If for no other reason, they are signigicant because the languages having these numbers are the possession of some of the largest remaining groups of vernacular-speaking Aboriginal people in Australia including Tiwi, Anindilyakwa and, quite possibly, all the related 'Yolngu-matha' languages of northeast Arnhem Land. Generalisations about Australian Aboriginal languages which exclude these large, viable language groups are misleading generalisations indeed.

The failure to acknowledge these may, however, be due to preconceptions about what constitutes a number. These preconceptions include the notions that number terms based on body parts are not numbers, that linguistic innovations are not numbers, and that compound terms analysable into other numbers are not numbers. It will now be argued that these preconceptions are misconceptions.

1.2 NUMBERS AND FINGERS

It is obvious in the works of many writers of the last century such as Tylor 1871 and Crawfurd 1863 that Aboriginal words for five and its multiples which are derived from words for fingers, hands or feet were not then regarded as proper numbers. This view persists, being evident in more recent literature, and may explain why Dixon and others ignore their existence. Wurm, for example, makes a point of distinguishing between the 'two or three numerals' and the 'few isolated instances' of terms indicating 'hand', 'foot' and 'person' (1972:63-4). Contrary to what these linguists say, it must be

emphasised that there are Aboriginal languages in which the number-words for five, ten and so on are not readily analysable to mean 'hand'. The examples given in Table 1 all have words for five which differ from the word for 'hand' and from anything locally recognisable or generally reconstructible as 'hand'.[3]

It is also true that the word for 'five' is etymologically related to the word for 'hand' in a large number of Australian languages. The practice is not isolated, as Wurm suggests, but very common. Nevertheless, even modern linguists such as Yallop (1982:145) continue to question the status of 'hand' and other body-part terms as numbers.

The view that body-part terms can not properly be regarded as numbers is difficult to substantiate in a universal context, for the phenomenon is extremely widespread. The acceptance, as legitimate numbers, of only those number words which are not etymologically related to body parts seems a very shaky proposition. It would necessitate discounting certain numbers in most of the world's counting systems. The word *lima*, for example, as pointed out by Lumholtz as long ago as 1889, means both 'hand' and 'five' in 'many languages from the Sandwich Island [Hawaii] to Madagascar' (1889:333). It would also cast suspicion on the validity of the English word 'five' which can be shown to be etymologically related to 'finger' (Klein 1971) and to 'fist' (Onions 1966). Indeed, digits ('numbers') are almost universally related to digits ('fingers'). It seems strange, therefore, in recent generalisations about Aboriginal number systems not to find at least some reference to the Australian occurrences of this universal phenomenon.

1.3 RECENT INNOVATIONS IN NUMBER SYSTEMS

Another attitude evident in the literature is that number words for five and above are recent inventions and, apparently therefore, invalid (e.g. Williams 1976:320). Certainly it is possible that some number innovations are recent. O'Grady et al. (1966:133) claim that the use of 'hand', 'foot' and 'person' to signify higher numbers in the Ngulibardu dialect of Nyangumarda is 'an elaboration that developed recently - almost certainly since the end of World War II'. Given the widespread occurrence of this convention, such a claim needs to be treated with caution. Saying that a researcher has observed a particular event for the first time is not the same as saying that the observation marks the first occurrence of that event. With respect to numbers, there has been a long tradition of attributing anything beyond two or three to European influence (e.g. Dixon 1980:108)—to settlers or missionaries or, in at least one case (Spencer 1914:466), to buffalo hunters.

An even longer tradition, as noted by Macknight (1972:291), attributes any alleged 'innovation' in Aboriginal culture,

particularly in coastal North Australia, to the Macassans who annually visited there for some centuries prior to 1907 and whose language had a considerable influence (Walker and Zorc 1981).

Wurm's comments on the existence of 'an Indonesian-type numeral system employing Australian morphemes' are in this tradition (1972:167). One might well ask how long an innovation from another culture remains an innovation or how much time must elapse before such an innovation is considered worth mentioning. These questions, however, are only hypothetical because there is little evidence of any substantial connection berween the Macassans and the base-5 number systems of eastern Arnhem Land. Although there would seem to be even less justification to claim, as Yallop does, that numbers 'have been borrowed, in northern coastal areas, from Macassan' (1982:145), Yallop and Wurm recognise that the numbers exist.

The Anindilyakwa language of Groote Eylandt, for example, has a number system with specific 'monomorphemically signalled' numbers up to 20. Some of these have been given in Table 1 using Tindale's spellings; a fuller table is given below using a more recent orthography. The Macassarese numbers are listed for comparison.

Table 2. Groote Eylandt Number Words

English	Anindilyakwa	Macassarese
one	*awilyaba*	*sere*
two	*ambilyuma*	*rua*
three	*abiyakarbiya*	*tallu*
four	*abiyarbuwa*	*appa'*
five	*amangbala*	*lima*
ten	*ememberrkwa*	*sampulo*
fifteen	*amaburrkwakbala*	*sampulo-lima*
twenty	*wurrakiriyabulangwa*	*ruampulo*

Although Worseley has suggested that Macassan influence is evident in the Groote Eylandt number system, the evidence, if any, seems minor (Worseley 1954:368; cf. Macknight 1972:296). The oldest Groote Eylandters who remembered the Macassans and who were well able to indicate which words in the Anindilyakwa language were of Macassan origin told the author that the number names themselves were not of Macassan origin (J. Harris 1979:117). Further weight is added to these statements by the fact that some of these informants understood and

recalled Macassan numbers. Macknight has already recorded the specifically Macassan numbers remembered by an Elcho Islander (1972:297). The fact that the memory of Macassan numbers is incomplete as noted by Macknight on Elcho Island (and confirmed by the author on Groote Eylandt)[4] is significant. Macassan numbers have not been used since the last Macassans left over 70 years ago and so are imperfectly recalled, but the number system of the local language which was used for purposes other than communicating with the Macassans is still in use.

The leader of the Gumatj clan of northeastern Arnhem Land, Galurrwuy Yunupingu, has recently provided some striking evidence of this in the detailed information he provided to Sobek. There is a word, *bothurru*, which is widely used in northeastern Arnhem Land to mean 'count'. Possibly derived from Macassarese *botoro* 'to gamble' (Macknight 1976:89), the term could be adduced to prove that the concept of counting did not exist prior to the Macassans. On this point, however, Galarrwuy said,

> . . . the proper Gumatj word for counting-- like when you have to know how many warriors there were or how many tutle eggs you got--is *dambuyangu*. That's our word, not *bothurru* really. That belongs to anybody . . . (Galarrwuy quoted in Sobek 1981:13)[5]

Galarrwuy then proceeded to detail the Gumatj counting system which, it transpires, is a base-5 system utilising the term *rulu* as the number base, the essential meaning of *rulu* being a 'bundle', specifically a 'bundle of five' in counting contexts. (The Gumatj number system is described in section 2.3.)

It is interesting to note that Aboriginal people of east Arnhem Land repeatedly associate their counting systems with the distribution of turtle eggs (J. Harris 1979:117) and of crocodile, seagull and magpie-goose eggs (Sobek 1981:18). Turtle eggs, in particular, are found in hundreds at one time and their distribution in multiples of five using traditional counting systems has been observed in Anindilyakwa (see Stokes, this volume), in Nunggubuyu (Burbank 1981, pers. comm.) and in Gumatj (Sobek 1981:18). The gathering of turtle eggs is women's activity of which Sobek has detailed descriptions (1981:34-5). This is no doubt why Groote Eylandt men, when questioned about numbers, generally suggest that difficult questions be resolved by talking to the older women. Trading with the Macassans was men's activity and it would seem logical that they should be the experts on number matters if Macassan trading activities were the origin of the number systems.

It is not claimed that the Macassan number system never influenced any Aboriginal number system. Rather it is argued that Aboriginal

number systems were in use between Aboriginal people at the same time as Macassan numbers were being used in communicating with the Macassans. There is every reason to presume that Aboriginal number systems were in use prior to the Macassan contact era and it can certainly be demonstrated that they have been in use since. As Macknight has pointed out, in attributing a cultural innovation to the Macassans, it is necessary to identify the model which the Aborigines are supposed to have imitated (Macknight 1972:291). The Macassan number system was a regular base-10 system and since Aboriginal number systems are not, attributing them solely to Macassan influence appears unwarranted. Capell, in reference to Nunggubuyu, seems to have been the only linguist to have made this point:

> On Groote Eylandt, however, and at Rose River, a system of counting by fives was developed, that could potentially extend as far as it was needed. The words used were not Indonesian words - for then the system would of course have been decimal - nor were the Indonesian words borrowed. It was just a quinary system that was built up out of purely native materials, and I do not know of anything similar elsewhere in Australia. For actual daily use the words are just impossibly long - though perhaps not to a people lacking clocks or even calendars! In Rose River language the counting is 1 - *anjbadj*, 2 - *wulawa*, 3 - *wulanjbadj*, 4 - *wulalwulal*(cf. ordinary Australian), 5 - *marangandjbugidj* (where *marang* - hand); but after that a unit called *maralibalibala* comes in, with *mari* 'and': 6 - *maralibalibala mari anjbadj*, and so on up to 10 - *wurumulumara ngandjabugidj*; 15 is *wurumulumbulanbadj*- apparently 5 x 3; 20 is *wurumulumbulalwulal* - 5 x 4. A full analysis of these numberals requires a considerable study of the structure of one of the most complicated languages in Australia . . . (Capell 1956:68)

The foregoing discussion of so-called innovations in number systems raises two significant issues. The first is that some 'innovations' may not be innovations at all in the sense in which those who use the term intend. The second is the rather more complex question of what an innovation is, particularly with respect to the arbitrary selection of dates or events after which linguistic changes are to be considered innovations.

1.4 COMPOUND NUMBERS

For well over a century, a vast body of anthropological and mathematical literature has contained virtually predictable references to the 'scanty as well as clumsy numerical systems' of Australian Aborigines

(Tylor 1871:243). Where such claims are exemplified, they are invariably shown to refer to a small, oft-quoted set of languages from which linguistic data are often provided to demonstrate the lack of 'special words' (Tylor 1871:242) or 'distinct terms' (Crawfurd 1863:103) for numbers above two, that is, the supposed lack of Wurm's 'monomorphemically signalled numerals' (1972:63).

It has already been shown in section 1.1 that some Aboriginal languages do have unanalysable terms for numbers higher than those generally claimed as the limit. There is, however, another issue involved in the persistent citing of Aboriginal languages as examples of languages supposedly lacking 'special' or 'distinct' number terms; it is an issue which, with respect to numbers, dates specifically from Crawfurd's 1863 paper but which in general terms dates from much earlier. This is the question of the legitimacy of compund numbers, the making of higher numbers by combining words for lower numbers.

All languages indicate higher numbers by the combination of words for lower numbers. Seventy two, for example, is a combination of seventy and two while seventy itself is derived from a combination of seven and ten. In an intellectual climate in which the superiority of the European culture was believed indisputable, it was easy for Crawfurd to argue that the point at which it became necessary to combine lower numbers to make higher numbers was an indicator of the progress of a particular culture toward 'civilisation'.

> **Among rude tribes with scanty series of numerals, combination to make new numbers is very soon resorted to. Among Australian tribes, addition makes 'two-one', 'two-two', express 3 and 4 ... (Tylor 1871:264)**

In view of the intellectual climate of the times, it is possible today to dispute Tylor's implications yet to understand how he was able to make them. It is far less acceptable to find Crawfurd and Tylor's views still pervading mathematical and even linguistic literature:

> A tribe living along the Belyando River in Australia counts like this:
>
> 1. Wogin
> 2. Booleroo
> 3. Booleroo wogin (=2+1)
> 4. Booleroo booleroo (=2+2)
>
> **Had a tribesman occasion to count beyond four, he might continue with 'booleroo booleroo wogin, booleroo booleroo booleroo'... These schemes are scarcely worthy of being termed numeration systems ...**

> Where the extent of man's mastery over nature is slim, his number system relects his ineptitude.
>
> 1. Neecha (1)
> 2. Boolla (2)
> 3. Boolla Neecha (2+1)
> 4. Boolla Boolla (2+2)
>
> A primitive chant? The sequence furnishes a fine accompaniment to the boom-boom drone of the tom-tom *(sic)*. Yet is is actually the complete counting system of a native Australiian tribe... We can scarcely imagine what it would be like to face the world around us with mental tools so crude and blunt. (Swain and Nichols 1965:1, 29)

Only recently have attempts been made to refute the claims which underlie these points of view. With respect to East African cultures, Zaslavsky (1973) has provided sound evidence which argues convincingly against ascribing low and arbitrary limits to the arithmetical thought of so-called 'primitive' African tribes. Among mathematics educators, Gelman and Gallistel (1978) appear to be the first to have taken up Zaslavsky's material. Barnes (1980) takes Crawfurd's notions to their absurd conclusions, showing that the French *quartre-vingt-dix* (4 x 20 + 10) must be evidence of a lower degree of civilisation than the English *ninety* (9 x 10) while an even lower status on the scale of civilisation must be accorded the Danes to whom ninety is *halvfemsindstyve* ($\frac{1}{2}$ [of 20] from 5 x 20).

> By Crawfurd's standard French culture is more primitive than that of the Kédang in Indonesia; for the French use a mixture of methods to name multiples of ten, while the Kédang language, like English, applies a single procedure consistently from ten to ninety. Judging by their cumbersome numbers, the Danes stand at the very threshold of civilisation. (Barnes 1980:197)

Barnes goes on to describe two Kédang number systems, one of which is used exclusively by Kédang children, the other by the adults. There are compund numbers in the adult number system such as *lemé - apaq* (5 + 4) for nine. The word for nine in the children's number system, *sukoq*, is not a compound number.

> According to Crawfurd's principle, Kédang children obviously have attained a more superior state of civilization than have Kédang adults, since the children use a separate name for each of the first ten numbers. (Barnes 1980:199)

Compound numbers are, after all, legitimate linguistic labels for a numerical concept. Barnes' insightful paper serves to highlight the absurdity of trying to make inferences concerning cultural superiority and inferiority from the nature and extent of compound numbers in a particular language. The compounding of lower numbers to create linguistic labels for higher numbers is a universal phenomenon. Aboriginal languages abound with interesting compounding techniques, a considerable variety of which have been recorded in the literature over a long period of time. There has, for reasons already discussed, been emphasis on the use of compound forms for three and four in a number of languages but there are many other compound forms recorded in the literature. Dawson, for example, records compound numbers up to 100 (Dawson 1881:xcvii-xcix).

It is a pity that Australian linguists have failed to give due emphasis to this compounding aspect of Aboriginal languages. Had they done so they would have helped to demonstrate the universality of the number-naming techniques which Aboriginal people share with the whole of humanity.

2. THE LIMITS TO COUNTING

2.1 THE NATURE OF COUNTING AND NON-VERBAL COUNTING

What are the limits to counting? In section 1 it was argued that many Aboriginal number systems have words for numbers which extend far beyond the limits generally ascribed in the literature. There is, however, another associated misconception that not only are the number words 'scanty' or 'meagre' but that they also represent the limits to counting.

A detailed discussion of the nature of counting itself is beyond the scope of this paper, but modern scholarship recognises that counting is a process which may be verbal but may also be non-verbal.

> The use of unique tags to mark or tick off the items in a collection is intrinsic to the counting process. Further, the tags must be used in a fixed order. Finally, the tags must have an arbitrary status; they cannot be the names or descriptions of the items in the collection being counted. The set of count words meets these criteria, but then so do other sets of tags. One obvious candidate is the alphabet, and it is noteworthy that many languages have used the alphabet as count words (Greek and Hebrew, for example). But the tags need not be verbal. They may be any of a host of entities, including short-term memory bins. (Gelman and Gallistel 1978:76)

Non-verbal counting techniques have been and still are in frequent use by Aboriginal people. Scoring the ground is still a common method although, predictably, it tends to be associated in the literature with inferences of cognitive inferiority. No such inferences seem to be drawn about the widespread use of tallying marks by modern European people in such diverse contents as scoring cricket runs or counting the sheep passing through a gate.

Non-verbal techniques are obviously necessary for the reliable communication of numbers over long distances. A variety of examples has been noted in the literature, the most frequent being the use of carved message sticks. Howitt (1904:691-710) describes a number of message sticks in detail, as does Mountford (1956:466-475). Among other things, these sticks could be notched to indicate information such as 'X is six camps to the west; he has eight others with him. They will visit you in twelve days time'.

Body-marking techniques have also been widely noted in the literature (Dawson 1881:xcix; Howitt 1904:697; Dixon 1980:108). One quite widespread system marked the phases of the moon with 28 successive positions on the body. Message bearers could have their actual bodies marked to indicate, for example, that a particular event was planned for a specific day in the lunar cycle. Dawson described such a system in 1881. The author has recently had one described to him by Pigeon Rankin, a member of the Ngalkbon language group. As long ago as 1904, Howitt was claiming that such techniques did away with the often-repeated statements about the low limits to Aboriginal counting (1904:698).

2.2 INDEFINITE DETERMINERS AND BASE-2 NUMBER SYSTEMS

Most of the discussion in the literature relating to the inadequacy of Aboriginal number systems refers to their verbal manifestations, holding to the narrow perspective that counting must involve the use of linguistic labels - counting words - to mark each successive item in a collection. It must be emphasised that the words themselves do not denote the limits to counting. Wurm (1972:63-4) tries to distinguish between Aboriginal number systems which 'extend indefinitely upward' and those which he claims do not. The limits to counting, however, are not discovered merely by examining sets of words. <u>All number systems extend indefinitely upward</u>. When, for example, a base-10 number is fed into a computer, it is transposed into a base-2 number because the internal computer language has only two numerals, one and two. This set of words does not impose any limit on the computer's internal counting system. The discovery, however, of a similar phenomenon in some languages has long been discredited as counting at all:

> **The natives can count only to three, then use feet and hands or repeat the word *mundroo* many times. (Gason, in Taplin 1879:77)**

A person could say *mundroo* as many times as the situation warranted and this activity would be, in every respect, counting.

Hale has provided an insightful approach to this use of a few number terms (1975:295-6). He suggests that these words are not primarily counting numbers but grammatical numbers, even though some of them are legitimately used as precise counting numbers. Using the Warlpiri language as an example, Hale terms these words 'indefinite determiners' (like the English a or some), because of their exact correspondence to the definite determiners. They are:

tjinta	'singular, one'
tjirama	'dual, two'
wirkadu	'paucal, several'
panu	'plural, many'

Hale's point is that these are not a sequence of numbers for counting. One never says *tjinta, tjirama, wirkadu, panu* in the same sense that one says one, two, three, four. However, the first two members of the indefinite determiner paradigm refer to exact numbers and these can be used with precision to refer to numbers beyond two in accordance with a base-2 system, e.g.: *tjiramakari - tjiramakari - tjinta*('five').

Hale goes on to point out that although there is, theoretically, no upper limit to this number system, there is a practical limit beyond which the numbers become unwieldy or cumbersome. Hale argues that the process of counting is present even while conventionalised numerals are not, a view which is supported by the rapid acquisition of the English counting system by quite unschooled Warlpiri people as soon as they need to operate with money. Dixon (1980:108) cites Hale and emphasises that no particular significance attaches to what he terms 'the absence of numeral systems'; such absence is not due to lack of mental capacity, but a lack of need for such systems in traditional Aboriginal culture. Although Dixon's basic point about cultural need is quite valid, his use of the phrase 'absence of numeral systems in Australian languages' is misleading. What is culturally absent from some but not all Aboriginal groups is not so much the need to count but the need to count precisely. The demand for precision with high numbers came with Western money and Western activities.

Langlands (1982, pers. comm.) has provided some interesting infor-

mation on the Martu Wangka language at Jigalong, W.A. Its system of indefinite determiners is akin to Warlpiri:

kuju	'singular, one'
kujarra	'dual, two'
yupalpa	'paucal, several'
yarninga	'plural, many'

If absolute precision is required above two, the speaker will normally use non-verbal numbers such as fingers or marks on the ground. Only when absolute verbal precision is required will combinations of the two exact numbers be used, e.g.: *kujarra-kuju* 'three'. The word for hand, *mara*, is also used in combination with *kuju* and *kujarra*. Whereas, by analogy with many other languages, it would be reasonable to expect that these terms would normally mean 5 and 10, the need for verbal precision among the Martu Wangka people did not normally extend that far. Thus *marakuju* and *marakujarra* are normally non-specific and mean 'about 5' and 'about 10'.

Langlands' free translation is 'a few' and 'a small mob'. Another non-specific number term is *jina-mara* 'foot-hand' which is repeated several times to indicate a very large number. Langlands reports that the younger people are beginning to use *marakuju* and *marakujarra* as precise numbers, 5 and 10. It is the writer's view that the potential for this has long been present but the need for such verbal precision has been rare.

Many Western writers project a totally unrealistic need for precision onto non-Western cultures and build theories of number development upon quite absurd speculations. One of the more notable examples describes the dilemma of a 'primitive man' observing animals in a forest and finding himself unable to communicate the precise number he saw to his fellows:

> . . . our primitive man ran into trouble. Can you imagine him staggering back to the tribe with 25 rocks, 87 rocks, or perhaps even 100 rocks in his hands to indicate that he had seen that many animals? (National Council of Teachers of Mathematics 1966:18)

The answer to the question is, of course, no, we can't imagine it because no one in his right mind would want to count, rock by rock, all the animals in a herd (and then carry this huge pile of rocks back home to communicate what he had seen). Rather a person would use a descriptive phrase such as 'a huge herd' or 'a very big mob'. English speakers may use counting numbers in a non-specific fashion

such as 'about 90' or '80 or 90'. Many Aboriginal languages have number words which are used in non-specific ways. Strehlow (1944: 104) shows that Western Aranda has a set of number words like those of Warlpiri and Martu Wangka just described: *njinta, tara, urbutja, ntjara*. As well, there are words for 10 *(munuruta)*, 20 *(iloa)*, 30 *(inoa)*, and 40 *(intitjeritjera)*. Strehlow, however, tends to dismiss these numbers because 'they had only approximate numerical values'. Yet these were exactly the kind of non-specific number words which one would expect to find for situations where *ntjara* 'many' was too vague or ambiguous.

Sayers (this volume) shows that Wik-Mungkan, a Cape York language, has a similar range of non-specific number words. There is a set of words for small numbers *(thonam, kucham, ko'alam)* which are used with varying degrees of precision. As Sayers points out, problems arose when teachers at the school tried to use these as precise counting numbers. As well, Wik-Mungkan has various ways of expressing generalised higher numbers such as *thaa' wantanam*, meaning a large group or number. The use of body-part terms can add a degree of precision when that is necessary, e.g. *ma'kucham* (two hands) - 'about ten' and *ma'yotam tha' thampang* (all hands and feet) - 'about twenty'. Aboriginal people, in common with all people, need from time to time to indicate numbers of things or the size of a group. Their languages enable them to do so, but there is no reason why any particular non-Western language should reflect the degree of numerical precision with which modern Western culture is preoccupied.

Gurindji is a language from the central region of the Northern Territory with a set of 'indefinite determiners' for small numbers like that in Warlpiri.

jintaku	'singular, one'
kujarra	'dual, two'
murrkun	'paucal, several'
jarrwa	'plural, many'

When precision in verbal numbers is needed, the two exact members can be combined as in the other languages. It has, however, recently been 'discovered' that the Gurindji have another distinct number system quite separate from these. McNair (1982, pers. comm.), a linguist working in the Gurindji language, described to the writer how Fracek, the local adult educator, was recently writing some English numbers on a blackboard for some of the old men. One of the old men told him that they had numbers of their own. McNair subsequently elicited the numbers one to fifty which, it transpired, were known by all the adults with whom they checked. They are all 'monomorphemically signalled' numbers and a portion of them are listed in Table 3.

Table 3. Gurindji counting numbers (portion)

English numeral	Gurindji number	English numeral	Gurindji number
1	*panturru*	12	*yanu*
2	*yurr*	15	*winimarl*
3	*kankunya*	18	*yirliji*
4	*parnti*	20	*yawarra*
5	*ngarra*	25	*marla*
6	*karni*	30	*ngarlka*
7	*yama*	35	*yawarta*
8	*murru*	40	*panana*
9	*tulu*	45	*kalijpa*
10	*ngamirri*	50	*lurr*

The old people were able to explain to McNair some of the circumstances under which the number system was used. Hunting was one context. Another was that it was used to count the number of warriors who went out to fight and the number who returned. Combining the use of the terms with tallies on the ground, one person carried out the operation 50-10=40.

Clearly, at some time prior to the coming of the Europeans, there arose a need among the Gurindji people to verbalise their number concepts and non-verbal counting procedures. Their response was the development of an alternate number system which was not based upon the combination of the members of the base-2 system, *jintaku* and *kujarra*, although these could still be used when precision was necessary in reference to small numbers. The system is now falling into disuse because most mathematical demands are now in Western contexts for which the English number system is perceived as the most suitable.

2.3 BASE-5 NUMBER SYSTEMS: THE GUMATJ EXAMPLE

The introduction of the word for 'hand' as a precise number enables a base-2 number system to become a base-5 system which is then able to express higher numbers in a less unwieldy manner. There are many examples in the literature. It was also shown in section 1.2 that many Aboriginal number systems do not express 5 or its multiples in terms of body parts. Of these, one particularly interesting

system is the Gumatj number system of northeastern Arnhem Land, outlined in Table 4. One of its more interesting features, the introduction of a new term at the modulus (base squared), is marked with an asterisk. The numbers in Table 4 are those given by Galarrwuy Yunupingu to Sobek (1981).

Table 4. Gumatj number system (portion)

Base 10 Numeral	Base 5 Numeral	Gumatj number
1	1	*wanggany*
2	2	*marrma*
3	3	*lurrkun*
4	4	*dambumiriw*
5	10	*wanggany rulu*
6	11	*wanggany rulu ga wanggany*
7	12	*wanggany rulu ga marrma*
8	13	*wanggany rulu ga lurrkun*
9	14	*wanggany rulu ga dambumiriw*
10	20	*marrma rulu*
11	21	*marrma rulu ga wanggany*
12	22	*marrma rulu ga marrma*
13	23	*marrma rulu ga lurrkun*
14	24	*marrma rulu ga dambumiriw*
15	30	*lurrkun rulu*
16	31	*lurrkun rulu ga wanggany*
17	32	*lurrkun rulu ga marrma*
18	33	*lurrkun rulu ga lurrkun*
19	34	*lurrkun rulu ga dambumiriw*
20	40	*dambumiriw rulu*
21	41	*dambumiriw rulu ga wanggany*
22	42	*dambumiriw rulu ga marrma*
23	43	*dambumiriw rulu ga lurrkun*
24	44	*dambumiriw rulu ga dambumiriw*

(Table 4 continued)

*25	100	*dambumirri rulu* [Base squared][6]
26	101	*dambumirri rulu ga wanggany*
⋮	⋮	
30	110	*dambumirri ga wanggany rulu*
31	111	*dambumirri ga wanggany rulu ga wanggany*
⋮	⋮	
35	120	*dambumirri ga marrma rulu*
⋮	⋮	
50	200	*marrma dambumirri rulu*
51	201	*marrma dambumirri rulu ga wanggany*
⋮	⋮	
60	220	*marrma dambumirri ga marrma rulu*
⋮	⋮	
75	300	*lurrkun dambumirri rulu*
⋮	⋮	
100	400	*dambumiriw dambumirri rulu*
⋮	⋮	
125	1,000	*dambumirri dambumirri rulu*
⋮	⋮	
130	1,010	*dambumirri dambumirri ga wanggany rulu*
⋮	⋮	
150	1,100	*dambumirri dambumirri ga dambumirri rulu*
⋮	⋮	
200	1,300	*dambumirri dambumirri ga lurrkun dambumirri rulu*
⋮	⋮	
250	2,000	*marrma dambumirri dambumirri rulu*
⋮	⋮	
300	2,200	*marrma dambumirri dambumirri ga marrma dambumirri rulu*
⋮	⋮	
375	3,000	*lurrkun dambumirri dambumirri rulu*
⋮	⋮	
500	4,000	*dambumiriw dambumirri dambumirri rulu*
⋮	⋮	
625	10,000	*dambumirri dambumirri dambumirri rulu*
⋮	⋮	

(Table 4 continued)

750	11,000	*dambumirri dambumirri dambumirri ga dambumirri*
:	:	*dambumirri rulu*
:	:	
1,000	13,000	*dambumirri dambumirri dambumirri ga lurrkun*
:	:	*dambumirri dambumirri rulu*
:	:	
1,250	20,000	*marrma dambumirri dambumirri dambumirri rulu*

It has already been informally proposed to the writer that Galarrwuy was engaging in language engineering or even inventing the system. It is therefore important that this question be considered. It is indeed possible, although by no means certain, that this may have been the first time that Gumatj numbers had been extended this far. In fact, Galarrwuy was quite specifically motivated to demonstrate that it could be done.

> **His enthusiasm stemmed in part from proving that his past teachers had been wrong in stating quite openly to him that the reason he experienced difficulty with mathematics was because 'Aboriginal people didn't have numbers or counting and that kind of thing before the *balanda* (Europeans) came.' (Sobek 1981:26)**

On the various occasions in which Galarrwuy explained the Gumatj number system, there were other Gumatj people present, some of whom were considerably older than Galarrwuy. These people understood what was happening and were involved in the procedure. They were able, for example, to construct a given number with concrete materials. On at least one occasion, Galarrwuy stopped to check his procedures with some older women who were not present (Sobek, 1982 pers. comm.).

There is little doubt that the majority of adult Gumatj-speaking people are familiar with this number system and find meaningful numbers in this system well in excess of one hundred (base 10). Generally speaking, numbers approaching and above about two hundred are less meaningful because they are not perceived to be functional. There is no traditional activity to which they could immediately be attached. On the other hand, those who were present with Galarrwuy obviously comprehended the construction of higher numbers and were most interested in the results. The procedures and concepts were familiar even though the formal naming of such high numbers may have been rare. Indeed, while conceding the rarity of the naming of these higher numbers in the Gumatj number system, the writer is not convinced that this instance necessarily marks the first occasion of their use. Admittedly, the system has not been reported until now in the liter-

ature but this reflects upon the anthropologists and linguists who were interested in more exotic things than numbers or who did not ask the right questions. This still does not excuse the modern linguists for ignoring the hints here and there in the literature. Tindale, as long ago as 1925, reported Groote Eylandters being able to handle 120 as a base-20 number.

3. NUMBERS AND COGNITION

Although the presentation of incorrect and misleading data on Aboriginal number systems has been a persistent feature of the literature, the inadequacy of the data is, perhaps, less serious than the contexts in which they are presented and the philosophical positions the data have been adduced to support. As has been shown, information on Aboriginal number systems has formed part of the literature which adopts the ethnocentric view that there are stages of development through which all societies pass on their way to that high degree of cultural development evidenced by European civilisation; progress towards these stages of development is accompanied by, if not prompted by, the evolution of 'advanced' mental capacities.

Although it can be argued, as Hallpike (1979) has done, that words like 'primitive' and 'evolution' are objective scientific terms without ethnocentric overtones, a survey of the literature relating to number systems suggest that this is not so. It appears to this writer that the term 'primitive' is used with ethnocentric connotations in anthropological, pseudo-anthropological, linguistic, historical and mathematical writings far more than it is used objectively. The association of 'primitive' and allied terms with ethnocentric philosophies is such that they have accrued connotations which are difficult if not impossible for the reader to avoid. Indeed Hallpike evidences this himself in his effort to argue the legitimacy and objectivity of the term 'primitive' in order to use it unambiguously in his writing.

The problem is really one of cross-cultural comparison; that is, with reference to the subject matter of this paper, the problem relates to the difference between studying the development of the number system of a particular culture and comparing the number systems of more than one culture.

The English number system, for instance, is a fascinating study in itself, showing considerable evidence of earlier non-decimal systems. The word 'eight', for example, is derived from an old compound number which was simply 4 x 2 and therefore possibly evidence of an earlier base-2 number system. It may be legitimate to call this earlier system 'primitive', in the chronological sense, although such

a label seems to contribute little to the understanding of the system.

It is, however, quite a different matter to compare the base-2 number system of a modern sociocultural group with the base-10 number system of another modern group and to label the base-2 system 'primitive', thus unavoidably labeling the people whose possession it is. It may be legitimate to make objective etic comparisons. It is not legitimate to use those comparisons to infer the cognitive superiority of one group over the other. Indeed, it is obvious in the literature on the subject that number systems are regarded as being peculiarly suitable as an index of cultural inferiority or cultural superiority. This rather remarkable logic (or lack of logic) would seem to be based entirely on the Western obsession with precision in number operations and the equating of mathematical skill with higher order cognitive ability.

In fairness to a few of the modern linguists who have been criticised in this paper, it should be acknowledged that at least in the cases of Dixon and Yallop, they were quick to point out that no particular significance attached to what they perceived to be a 'paucity' of Aboriginal numbers. They both stressed that other fields of Aboriginal knowledge and endeavour were elaborate, detailed, intricate, and demanding of a high level of intellectual skill. It is, on the other hand, regrettable that in so summarily dismissing the rich field of Aboriginal mathematical concepts, they, perhaps unwittingly, have helped to perpetuate misconceptions which should long ago have been laid to rest.

It is amazing that Stokes' paper (this volume) is, as far as the writer can ascertain, the first substantial discussion of the mathematical concepts of an Aboriginal group which has ever been published. It is to be hoped that many more will follow and that accurate information will begin to enter the linguistic, anthropological and mathematical literature and put an end to the misconceptions of the past.

FOOTNOTES

1. The author has been principal of several Aboriginal schools including Bamyili, Angurugu (Groote Eylandt), and Kormilda College. He is currently head of the Department of Education Studies at Darwin Community College. His particular interests are in Aboriginal knowledge and world view and their implications for education.

   In the preparation of this paper, valuable assistance was provided by a number of people who made available hitherto unpublished data from the following languages:

Gumatj	Galarrwuy Yunupingu and Vivienne Sobek
Gurindji	Norm McNair
Martu Wangka	Bill Langlands

   Vicki Burbank provided some information on the use of Nunggubuyu numbers in gathering turtle eggs.

2. The authors' original spellings have been retained in this table except that Osborne's spellings have been amended to use only English lettering. The modern Anindilyakwa spelling is given in Table 2.

3. | | | | | |
   |---|---|---|---|---|
   | Kokata | *ngerla* | 'five' | *murra* | 'hand' |
   | Anindilyakwa | *amangbala* | 'five' | *ayarrka* | 'hand' |
   | Tiwi | *punginingita* | 'five' | *wamuta* | 'hand' |

   Capell's common Australian wordlist gives *marang* for 'hand' (1956:88).

4. 'Old Charlie' Galiowa Wurramarrba recalled, for example, that the Macassan for 'five' was *lima*. In fact, the word has totemic significance to the Wurramarrba clan and is used as part of certain names and other important words.

5. *Dambuyama* 'to count'. Galarrwuy used the imperative form, *dambuyangu*.

6. The introduction of the term *dambumirri rulu* at the modulus is significant. The term for 5^2 or 25 would otherwise have been *rulu rulu*. *Dambumirri* also means 5 when standing alone. Galarrwuy, in fact, said it was an alternative to *wanggany rulu*

but was not preferred. The mathematical strength of its introduction is that ***rulu*** is thus freed to stand outside the conceptual brackets, being multiplied by the total of all numbers which precede it.

e.g. *(dambumirri ga wanggany)rulu*
= (5+1)5
= 30

(dambumirri dambumirri ga marrma)rulu
= (5x5+2)5
= 135

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Work Papers of SIL-AAB
Series B Volume 8
December 1982

ABORIGINAL MATHEMATICAL CONCEPTS: A CULTURAL AND LINGUISTIC EXPLANATION FOR SOME OF THE PROBLEMS

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An earlier draft of this paper was read at the sixth Annual Congress of ALAA, Canberra, August 1981.

1. RELATIONSHIP BETWEEN LANGUAGE AND CULTURE

In the day-to-day dialogue between Aboriginals and white Australians there are frequent misunderstandings. Sometimes these are plainly linguistic in nature with the Aboriginal not being able to understand English or to express himself clearly in English. But this is not always the case. Frequently the White argument and the Aboriginal argument are like parallel lines of a train track running along together but never meeting. A concept such as that of 'viable industries', which I have tried to explain, can be so foreign to Aboriginals that it is almost impossible to convey it adequately to the community. As one bright young Wik-Mungkan said to me at a community meeting, 'Explain it if you can!' In these cases it is often not the language itself that is not understood, but the underlying concepts that the language is expressing. I have been in the same situation in the Wik-Mungkan community at Aurukun. I have understood what was said in terms of understanding the linguistic aspects of the language, but I have not understood the message they encoded. Such messages were incomprehensible because I did not understand the presuppositions on which they were built, nor the Aboriginal concepts which were involved. To sum up, I could understand what was said but not what was meant.

The misunderstandings that develop in such cross-cultural communication are related largely to the underlying values and concepts that each party holds - and holds at a subconscious rather than a conscious level.

Language is spoken by social man, or as Saussure put it, 'Language is a social fact'. That is, language is spoken in a social context and is used in that social and cultural context in a meaningful way in ongoing exchanges with others. The focus is on meaningful. In the familiar social and cultural setting of the mother tongue, normal exchanges are meaningful. The confusion and misunderstandings of cross-cultural communication are absent because the mother tongue adequately meets the communication needs of the speaker. It is also relevant that the speaker not only knows how to say things, but what to say. What he wants to say in that socio-cultural setting is distinctive to that setting and related to it. As Malinowski said in 1923 (1966 reprint, p.307), 'A statement in real life is never detached from the situation in which it is uttered'.

2. RELATIONSHIP BETWEEN MATHEMATICAL LANGUAGE AND CULTURE

2.1 THE DEVELOPMENT OF MATHEMATICAL LANGUAGE

The history of the development of English mathematical terminology has helped me to recognise how the concepts developed in Western culture and how the language to discuss them followed. Whorf's observation about the effect of the Industrial Revolution on language is appropriate (1956:157):

> **In the Middle Ages patterns already formed in Latin began to interweave with increased mechanical invention, industry, trade, and scholastic and scientific thought. The need for measurement in industry and trade, the stores and bulks of 'stuffs' in various containers, the types and bodies in which various goods were handled, standardizing of measures and weight units, invention of clocks and measurement of 'time', keeping records, accounts, chronicles, histories, growth of mathematics and the partnership of mathematics and science, all co-operated to bring our thought and language world into its present form.**

Halliday (1978:197) also talks about this development in English: 'It took English three or four hundred years to develop its register of mathematics, science and technology and they are still developing'. In our Western culture a high value is placed on mathematical skill. 'We count, measure and weigh everything. Our principle idols, such as money and machines, all rest on a pedestal made of figures and

calculations' (Vaszolyi 1976:36). Vaszolyi goes on to say, 'For the Aboriginal hunter, however, figures and counting are irrelevant'. The Aboriginal hunter had no need to count. As a hunter he either had enough or he needed to continue hunting - or if it were too late too hunt he would simply go without.

It seems obvious that there would be gaps in the mathematical terminology of Aboriginal languages when compared with English with its highly developed mathematical concepts - concepts and language that developed over a long period of time, as previously mentioned. Halliday (pers. comm.) sees the problem of mathematical terminology in Aboriginal languages more in terms of the briefness of time available to develop them than in terms of inability to do so. Traditional Aboriginal culture did not need to count, weigh or measure and as a result did not develop the appropriate concepts or language.

2.2 WIK-MUNGKAN MATHEMATICAL LANGUAGE

If we look briefly at the Wik-Mungkan number terms, we can say that the term *thonam* 'one' is the only real number with a fixed value. *Kucham*, usually translated 'two', is not necessarily an exact two. An example of this usage was an Aboriginal preacher who gave his second point, his next second point and then closed with his third point. *Ko'alam* likewise is frequently translated 'three' but may mean 'four' or a more generalised 'few'. A teacher at Aurukun (Kath Hinchley, pers. comm.) told me that *thonam, kucham* and *ko'alam* were being taught as the precise numbers 'one', 'two' and 'three' but that sometimes the children used *ko'alam* to mean either 'three' or 'four'. After she had seen the problem, she would remind the children that numbers are a fixed value. The dual pronouns in Wik-Mungkan are a more definite two, e.g. *pula* 'they dual' or *ngala* 'we two', or more accurately 'I and you (sg)', that is 1+1.

Other maths-related terminology in Wik-Mungkan includes *yot* 'lots' and *thaa'wantanam* 'a vast mob'. As well, both *ko'alam* and *yot* can be reduplicated as *ko'-ko'alam* 'a few less than lots', and *yot-yotam* 'a big mob - less than a vast mob'. The word *ma'* 'hand' is also used with *'thonam', kucham, ko'alam* and *yot*, making *ma'thonam* 'once', *ma'kucham* 'twice', *ma'ko'alam* 'three or a few times' and *ma'yotam* 'lots of times'. This is the everyday usage of these terms amongst the Wik-Mungkan today, but older speakers also use *ma'* 'hand' to roughly indicate five. *Ma'yotam*, which could be translated 'the whole hand', may be used to indicate five but is also used to roughly represent a week. Likewise, *ma'kucham* 'two hands' is similarly used to indicate ten, or two weeks.

Tallying methods were also used by the Wik-Mungkan. To indicate when a ceremony would be held, the days would be tallied by turning the

fingers down. There are no monomorphemic terms for this, but the messenger would turn each finger down and say *ma'yinang* 'hand like this'. The word *tha'* 'foot' could also be used. A term roughly equivalent to twenty is *ma'yotam tha' thampang* 'all the hand and the feet also'. For larger numbers, such as thirty, a second person could be involved, as for example, *tha' ngatharam, a' wanch thum ngatharam ma' tha'* 'my feet and my wife's hands and feet'. Longer periods of time are also indicated by the moon, such as *kep thonam kan'an wanta* 'when one moon has passed'. Tallying was apparently also done on a message stick. While I have never seen this method used at Aurukun, such usage is widely reported in the literature. J. Harris (this volume) provides examples of both tallying and non-specific number terms used by other Aboriginal groups.

It is an undisputed fact that terminology can develop in a language when there is a need. I see the problem in Aboriginal languages being that the need is an imposed one. It is outside pressure that makes the concept development necessary - not felt need in the community. For many Wik-Mungkan people precise numbers are not understood, and who in the community at Aurukun would want to talk about fractions or square roots? These terms could be developed by language engineering, or to use a less offensive term, by language planning, but such efforts are hastening the process, as Halliday says (1978:197): 'Developments that took centuries in English and French are expected to happen in ten years, or in one year, or sometimes one month. This requires a high degree of planned language development.' (For a discussion on such planned language development see Leeding 1976, 1977 and 1980.)

The absence of precise Wik-Mungkan terminology is more than simply 'a gap in the inventory of cultural items' as Hale (n.d.) sees it, and I disagree with his statement that 'filling the gap is a rather trivial matter'. Hale bases his statement on his experience with the Warlpiri's handling of money. I cannot say that my experience with the Wik-Mungkan and money has been that simple. Most Wik-Mungkan that I dealt with knew that the name of a purple note was five dollars and that the name of an orange one was twenty, but many did not seem to know that four five-dollar or purple notes was the same value as one twenty-dollar or orange one. Some seemed to buy by the name or the colour of the note and if they had the right one, that was all that mattered, i.e. having the money to pay for something was often more important than whether the item was worth that amount of money. Some Wik-Mungkans, of course, handle money very well, but from talking to others who have worked with Aboriginals, it seems to me that my experience is more likely to be the norm.

Hale would probably agree with Boas (1974:25) who said that some people do not count because they do not want to. I agree with this,

but feel that it is only part of the answer. The question remains, why doesn't the Aboriginal want to count? I believe the Aboriginal not only doesn't see any value in precise counting, but, particularly in a more traditional Aboriginal environment, he doesn't understand the number concept basic to counting. I base this statement on the following discussion.

2.3 TRADITIONAL ABORIGINAL WORLD VIEW

The traditional Aboriginal saw things in terms of specifics rather than generalities. In his world, items such as his spears were unique, each recognised by its individuality. A missing spear would thus be the loss of a particular spear rather than just one of a number of spears. Without mass production producing large numbers of identical spears, it seems quite reasonable that each spear was seen as unique. Such an item in Wik-Mungkan is described as *ma' nunga* literally 'his hand', but a freer translation would be 'his handiwork', or 'his style'. There is nothing of this individuality about boxes of matches, packets of tea or any other mass-produced item sold in the store. As Boas (1974:25) put it,'It must be borne in mind that counting does not become necessary until objects are considered in such generalized form that their individualities are lost sight of'.

I would like to look at the reverse of this statement. That is, while objects are seen in such individualised form, it will be very difficult for anyone to abstract number from them and thus be able to count. Boas goes on to say: 'For this reason it is possible that even a person who had a flock of domesticated animals may know them by name and by their characteristics without ever choosing to count them.'

This is true about Aboriginals and their dogs. My next door neighbour at Aurukun had many dogs and he knew each one individually, but he had no idea how many he had except to say that he had *yot*, or a lot of dogs. The police restriction on dog numbers was a constant problem to him. He knew he had too many, but he could never understand the police method of numbering his individually precious dogs, nor could he see how dogs could be kept by number rather than by their individual worth.

Perhaps at this stage I should point out that Aboriginals do generalise. Were this not the case there would be no concept such as *kurow* 'salmon' or *ka'ant* 'catfish' or even a more general term like the word for fish. In Wik-Mungkan there is even a still more general term, the term *minh*, a generic term for all edible protein food — meat, fish, eggs. This term applies whether the animal is alive or the egg raw, or whether the protein food is ready to eat. When talking about fish the term *minh*

may be used alone or it can co-occur with the more specific word for fish *nga'a*, that is *nga'a* does not usually occur alone. Thus *minh nga'a* is the generic form for 'fish'. The Wik-Mungkan do classify and generalise, but their classifications are often different to ours, a fact that is more obvious in noun-classifying Aboriginal languages. I would like to point out, however, that the generalisation that leads to such concepts as 'salmonness' could be said to exist in a concrete form, i.e. related to the fish, whereas the concept of number has to be related to a non-concrete property. From this perspective it can be seen that number is a more abstract concept. As I mentioned before, there is a generic word for fish and some Wik-Mungkan would tally up a catch of fish by number. But for others the differences would be in focus; so it would be difficult for them to add items that were not seen as 'the same'. For them a tally of fish would be, for example, three salmon, two catfish and one grunter, rather than a tally of six fish.

However, Aboriginals abstract other concepts such as 'kangarooness' in a way that is difficult for the white man to understand. This shows that his perception of the universe is different to that of the Whites. While the White is happy to abstract number or colour from various items—for example, to see 'greenness' as the common factor between green leaves, green grass and green frogs — the Aboriginal does not see this, that is, an Aboriginal who has not come into contact with Western education. Likewise, he does not see 'threeness' as the common factor between three blocks, three balls and three toy trucks. On the other hand the Aboriginal sees 'the essence of kangarooness' in the animal kangaroo, the man of kangaroo totem, and the totem place — the *aawa* in Wik-Mungkan. The white man does not see this relationship and is usually puzzled if not sceptical when an Aboriginal refuses to shoot a kangaroo because a man of that totem is missing in the bush. His explanation that he could be shooting his brother seems far fetched. Likewise in mining or oil exploration the idea of hurting the totem animal of that place (i.e. his brother) is frequently rejected as 'rubbish'. But when a notion such as 'kangarooness' is recognised, the Aboriginal position can be understood.

Thus it can be seen that there is a close relationship of culture to language. As I see it, it is quite reasonable to have not only gaps in the mathematical vocabulary, but to have corresponding gaps in the concepts of that culture — concepts which are needed before the vocabulary can be developed.

3. MEASUREMENT IN WIK-MUNGKAN

In this section I will be looking at the linguistics of the Wik-Mungkan in Pam Harris' volume (1980) ***Measurement in Tribal Aboriginal Communities***. Having known Pam Harris for some years I read it with

great interest. In looking at the data that she presents — data collected from 22 linguists — some interesting facts emerge. As a result of reading the questions and considering the Wik-Mungkan responses which would be possible in such a situation, it became immediately obvious to me that the material presented in this book is more a compilation of data than an analysis of it. The material presented by the linguists appears to be accepted at face value without an understanding of the semantic systems behind the material. This is probably because Harris looks at the data as a teacher rather than as a linguist. (Also many of the respondents' answers appear to be English explanations rather than vernacular examples.) Another factor that is immediately evident is that Harris was looking for equivalents to English semantic categories rather than looking to see how Aboriginals themselves discuss measurements.

Harris (1980:49) asks such questions as 'Does the language have an abstract term equivalent to the English word _____ such as in _____?' She summarises the responses to ten such questions in the following table.

TABLE 1.

Number of Negative and Positive Answers to Type 1 Questions (Harris 1980:49).

Abstract Term	Yes	No
Length	3	18
Height	1	19
Distance	3	19
Time	7	12
Speed	-	17
Weight	1	19
Area	2	18
Volume	-	20
Money	22	-

In summing up this table Harris says that 'with the exception of time and money there are almost no abstract terms referring to the areas of measurement in this study'. On this point I agree with her. Regarding the absence of abstract terms, she goes on to say, 'It does not imply that Aboriginals are therefore unable to discuss length, height, distance etc. They merely do it in a different way. However, the lack of abstract terms could be an indication that such measures are unimportant in Aboriginal life,... '

I agree that these measures are unimportant in Aboriginal life — I would even go so far as to say that they are irrelevant. In discussing length, distance, height etc., Aboriginals discuss them in a very

concrete way rather than with the abstract terms referred to in the questionnaire. The Wik-Mungkan answers reveal this. I believe that this is not a mere difference in terminology but a major difference in concept development and is therefore one of the causes of the problems so often experienced in teaching or discussing these areas of applied mathematics.

In considering Aboriginal terms for measurements, a rather obvious question arises: how could an Aboriginal ask a question such as 'What length is that?' if he didn't have a number or measurement system with which to reply? Such a question would normally evoke an answer such as '75 cm', '2.4 metres' or some such figure. Of course it would be possible to answer in Wik-Mungkan with a comparative such as 'It is long like from here to Charlotte's house'. But an answer such as 'It is long' with no such qualification would be meaningless. In Aboriginal conception, height, length, breadth etc. are not features that are abstracted. They are an inalienable part of the item under discussion. There is a significant difference in asking 'What <u>length</u> is this?' (Harris' question) and the question a Wik-Mungkan would ask: 'Is <u>this</u> long?' or even 'Do you call <u>this</u> long?'. These questions show how length, height etc. are specifically related to the item in question.

In the Appendix, I give a possible Wik-Mungkan alternative for the first of Harris' questions on each topic in her questionnaire. As I see it, these examples show a basic difference in the Aboriginal's conception. He can ask, 'Maybe this is big, maybe it's small?' or he can ask, 'Maybe this is big, maybe it isn't?'. In each case he does it by a binary opposition -- either by an antonym or by negation. His language makes use of binary opposition as a means of comparison in many instances, but it proves unsatisfactory to a present day Wik-Mungkan in describing, for example, two men of almost the same height. To say, 'Tom is tall, John is short', or 'Tom is tall, John is not tall' now fails to satisfy in terms of the preciseness of the comparison. These days 'more' is frequently borrowed and a Wik-Mungkan child will say, *Tom more pi'an* (big) 'Tom is bigger'.

It can be seen from these examples that terms used in applied mathematics are not usually abstracted in the Aboriginal's semantic system. As far as Wik-Mungkan is concerned, the 'nearest equivalent' type of data presented in Harris' volume is really something quite different and thus could cause a lot of problems. As with number and colour, special care is needed when teaching these concepts to children. A child would need to have mastered the number system before being able to deal with its application to these measurement concepts.

4. SOME TEACHING IDEAS

As someone who is untrained in teaching, especially in mathematics, I am probably asking for trouble; nevertheless I still venture to make some suggestions. These ideas come largely from my own experience at Aurukun prior to 1977, particularly with children in my home.

From my observation, many white teachers of Aboriginal children seem to have only a limited interest in the semantic systems of the child's language; there is also little interest in other mathematical systems the child uses — systems which are quite different to those taught in the schools. The obvious example is card playing. These systems will be discussed in relation to teaching 'school' mathematics, and then suggestions given for introducing unfamiliar mathematical concepts.

4.1 CLASSIFICATION SYSTEMS

Firstly we will look briefly at the child's classifying ability. Wik-Mungkan is not a noun classifying language, but many Aboriginal languages are. Semantic 'sets' can easily be seen in these languages, but even languages without such systems still make classifications which are different to those made in English. For example, in Wik-Mungkan there is the classification of edible protein food -- meat, fish, eggs versus inedible animals etc. There is a similar distinction between edible plants and inedible. Other items for which there are generic terms, that is classifying terms, are snakes, fish and trees. These give a basic understanding of how the Wik-Mungkan 'cuts up the universe'. Where applicable, noun classes which distinguish various shapes could be used to introduce the notion of shapes. There may or may not be considerable overlap, but the Aboriginal system needs to be recognised and where possible used as a way to move from known to unknown. The white teacher's problem is that he is often not aware of the classifications in the vernacular and if he is, it is often difficult to find suitable one-word terms in English for the classifications. He also may have difficulty convincing the education authorities of the validity of his suggestions for classroom use.

4.2 CARD PLAYING

Many Aboriginal children play cards from an early age — 'gamble' as they call it at Aurukun. While still at Aurukun I briefly observed the children playing cards and I was amazed at the speed with which they came up with the answers. As the children's visual memory and visual discrimination are very good, it seemed to me that their speed was related to their exceptional visual memory, a memory for spatial

arrangement or pattern, rather than with their ability to add and calculate — although at least some adults count and calculate.

Davidson (1979) writes of the method of arriving at the score in card games at Bamyili. In the games he describes, the card being identified is covered, apart from the edges, and the pattern is identified in terms of the arrangement of motifs, the top part of the numerical symbol, and slight individual differences in the corner suit identification. This is a lengthy process. Davidson's observations are important because they deal with the method of arriving at an identification of the cards. He sees it not as a matter of number recognition, but more one of pattern recognition. This is the conclusion I had arrived at when I observed the Aurukun children in 1977. It would seem, however, that at Aurukun the children instantly recognised the placement of motifs on each card and also the motif combinations in adding the cards together, judging by the speed with which they arrived at the answers. (There are other accounts of card playing, such as Robinson and Yu 1975 for the Kimberleys and Holm and Japanangka 1976 for the Centre.)

One feature of card playing that seems to be common is that the tens are ignored in score totals, e.g. 3+4=7 but 7+5=2, the 10 being dropped. So in card playing 3+4 gives a higher score than 7+5. The Aurukun children recognised the scores as soon as they saw the cards — before I could add them up! (One Aurukun teacher told me that she has had the same experience.) Another feature is that totals of 10, 20 and 30 are considered the same — such a total is necessary from any three of the five cards dealt before a player can score with the other two. Again we see the ignoring of the tens value, the focus being on the zero units. One teacher recently told me that some children could add up before learning to play cards, but then began dropping the tens. Some of these children could add it in when reminded.

It seems to me that for the Aboriginal card player, a card could be described as a pattern with a name — the 'name' for at least some players having little association with the numerical value of the card. So, for example, a 5 would be seen as a certain pattern, not necessarily related to the 'fiveness of five', or a 3 to the 'threeness of three'. If the card playing child is to achieve in mathematics at school, he needs to know that the two systems are different. He not only needs to learn number recognition skills but he needs to learn the underlying value of each number.

4.3 TEACHING THE CONCEPT OF NUMBER

Problems in grasping this notion of 'the threeness of three' are often multiplied for the child who comes to school and is very soon introduced to counting — and with counting, the use of numbers as an

index, that is as an address. For example, children are lined up and numbered and then addressed as number 3, or number 7. The next day they will be in a different order in the line and will have a different number. Thus the use of numbers as an index reinforces the idea that a number is a name. So it is no wonder that the child is confused when number words are taught as having consistent numerical value.

I would suggest that the use of numbers as an index should be left until after the value of the number words is understood. Omitting counting would be very hard for the teacher who usually teaches counting as the earliest number skill — and of course a pre-school child in our society is considered 'clever' if he can count. The problem arises when a child who can count is assumed to know the numerical value of the number words he has used. Omitting the use of number words in addressing children would probably help the child to grasp that the number was not just a name for the one person or item so numbered but was actually a total of all the numbers that had gone before, e.g. 7 = ...⑦... not .....⑦...

4.4 TEACHING NUMBER AS AN ABSTRACT PROPERTY

I would suggest that the 'threeness of three' etc. be taught before there is a heavy emphasis on counting. I would further suggest that this be done with introduced mass-produced items that don't have any obvious distinctions. Thus, with obvious distinctions eliminated, the child should be able to generalise enough to abstract number from them. Each traditional item is unique, so it would be harder for the child to generalise if these were used. After all, the need for precise number skills is related to the introduction of Western technology, mass production, trading etc.

My observation of Aboriginal children is that they do not seem to grasp 'three' as something that can be instantly recognised, whether it be three blocks, three toy trucks or three cans of soft drink — although the cans of soft drink would be recognised first. The relationship of three cans of soft drink to three children is one concrete example that would probably be grasped quickly. (My teacher friend tells me that even this fails sometimes, as cans of drink are passed around and 'lolly bars' shared so that no one misses out.)

I would suggest, for example, that three of various items be used until the children can see that the common thing about each group is its 'threeness'. The child should instantly be able to recognise 'three' without having to count each time, e.g. three fingers held up for a brief period, too brief for the child to count. This would be repeated with other numbers until the children learned to associate a number word with a specific number of items — that is with its

numerical value. The number symbol would also need to be associated with the numerical value, especially if these symbols are covered in card playing and are not used in recognising the value of the card (Davidson 1979).

While I would suggest that the pattern associated with a particular number be used when first dealing with a particular number, so that the number name, the symbol and the pattern can be associated with the numerical value of the card, I strongly recommend that the child learn that the number name and symbol are not restricted to that particular pattern. The component parts of a particular pattern would need to be manipulated into as many other patterns as possible. My personal experience with children in my home at Aurukun was that this was extremely difficult for them. Once the original or distinguishing pattern was broken they found it difficult to accept that any other arrangement of the same items was, of necessity, the same number. But they need to make this cognitive leap — a leap analogous to that of Piaget's conservation — before they will be able to grasp the intrinsic 'threeness of three' concept.

4.5 TEACHING BY EXCLUSION

To help in teaching the concept of number, I also suggest what I call 'teaching by exclusion'. I would take, for example, the number three and say, 'This is three, it is only three, it is always three; it is never four, it is never two, it is never ten', etc. As a specific number may be focused on by the teacher for a week or so, maybe 'teaching by exclusion' would help the child to 'remember' this number — that is, he would grasp that it had a fixed (not random) and exact value. It was the same from one week to the next. The use of exclusion is an Aboriginal way of defining an item. I have used it very successfully in teaching colours, but I have not had an opportunity to use it for number. I was asked not to suggest it for teaching number in the school as it could interfere with later sophisticated concepts. I would be much bolder today in stressing its value, for without a grasp of basic concepts, how can the more advanced concepts be understood?

For the score of card combinations the same principles apply. The cards are recognised by the pattern combinations and the score could be seen to be more a name than a real numerical value. To see the difference between the two systems - cards and school - the player needs to know that in school, in the White system, it is important to know the intrinsic value of the numbers he uses, both in relation to individual cards and to the card combinations. I would hope that once the numerical value of the individual cards was understood, the whole notion of numerical value related to number names and symbols would also be understood. Thus a player

who would see 10, 20 or 30 as the same for scoring in cards, would know that these were numerically very different. He would need to know this to understand the tens system, so basic to understanding Western mathematics and money. I know some educated Aboriginals who do not understand the tens system. I saw one man in the store add rapidly across the columns in a zig-zag fashion. He knew all the combinations but his total was way out. There is a need to know that 7+5=12, a larger number than 7, the total of 3+4. Obviously my friend who added in the zig-zag manner didn't know this. His addition of 12+7 would be 10, i.e. 1+2+7, rather than 19.

Of course some Aboriginals at Aurukun are very good at numbers and handle money, banking, shopping, mail ordering as well as weighing and measuring very well. Some, it would appear, also use their number skills in card playing, though for various reasons I have not observed the adults play. However, illiterate Aboriginals who play cards would, I suspect, use the pattern recognition system. I have also observed children who were known poor achievers at school play cards with speed and apparent skill.

For applied mathematics I believe it is essential that teachers understand the significance of the absence of abstract terms for length, weight, height etc. If there were abstract terms, it would imply the existence of a numerical measuring system. It would also imply a system with fixed or exact units of measurement. ('True' and 'constant' are the terms Holm and Japanangka 1976 use.) Before a child can hope to master measuring, for example, he must understand the basic 'threeness of three' concept, an unchanging value, and he also must understand that the units of measurement are fixed and exact. The same teaching by exclusion could be helpful here: a centimetre is this long, only this long, always this long, never longer, never shorter. This seems to help remove the concept of uniqueness (and for some the associated concept of randomness), concepts that hinder the ability to understand the fixed and exact nature of measurements. So for applied mathematics the child has to master two systems: firstly the 'threeness of three' concept and then the 'fixed and exact' concept. Once the child has grasped these concepts he should be ready to use centimetres, grams or any other unit of measurement applicable to the task at hand.

5. CONCLUSION

As a closing comment I would like to suggest that it is not the use of borrowed terms that causes the problems in Aboriginal understanding of mathematics, but the basic misunderstanding of what these terms mean. This would apply to both number words themselves and also to words such as length, speed, weight, area etc. It also applies to units of measurement which must be seen as fixed and exact.

As I have shown, there are cultural and linguistic reasons for the problems encountered in mathematics education. As I see it, unless there is community desire to develop vernacular terminology, as in Anindilyakwa, it would be better if English terms were used and the vernacular left for family life and traditional interest. This could lead to a stable bilingualism, a much more realistic goal than having Aboriginals able 'to talk about anything under the sun' in both languages, as Hale and O'Grady suggested in 1974. Such a specialised bilingualism without a total overlap of function would be more likely to maintain the Aboriginal vernacular, for if you can 'talk about anything under the sun' in both languages, there soon would be no need for the vernacular.

If an Aboriginal child is going to progress at school he needs to learn the concepts discussed above, and his ongoing mathematical education would need to be in English; so it seems reasonable to introduce the borrowed term with the new concept as it is taught. Of course, if the child is to remain a traditional Aboriginal he doesn't need to know. And how 'Aboriginal' he will remain is a very real problem to some educators as well as to some Aboriginals.

APPENDIX

Wik-Mungkan Alternatives for Questions in Harris 1980.

1. What length is this?

In ongk ey
this long quest
'Is this long?'

2. What height is this?

In achantang than ey
this tall stands-it quest
'Is this tall?'

3. The distance is shown on the signpost

Signpost alangan waa'an ngant, aak kech nath,
Signpost that(trans) tell us-it to-us place far maybe
or nath ya'
or maybe not.
'That signpost tells us whether the place is a long way,
or maybe not.'

4. It takes a long time

Aak yaam yump-yumpanak ey
time long for making (doing) Q.
'Does it take a long time to do that?'

The same form with different intonation would translate
'It takes a long time to do, doesn't it!'

5. At what speed did they travel?

Than erkam mo'in ey
They fast ran-they Q.
'Did they run (travel) fast?'

6. What weight is it?

yuk in anhanh ey
thing this heavy Q.
'Is this thing heavy?'

or

Yuk anan, nath anhanh nath ya'
they that maybe heavy maybe not
'Maybe that thing is heavy, maybe it's not.'

7. What is the area of the land you want?

Nint kaangk aak we'ara pi'-pi'an ey
you like place wide mind-you Q.
'Do you want to keep a wide piece of land?'

(This is an unlikely question. 'Do you want to keep this wide piece of land?' would be more likely. This type of question would be related to asking about traditional land for land rights, so the land in question would be specific.)

8. Volume

e.g. a block of wood — the only way would be *yuk ina pi'an* 'This wood is big' or one could ask,

nint kaangk yuk pi'an ey, or manya
you like log big Q. or small
'Would you like a large or small log?'

Note also that or is borrowed.

Similarly for an amount of water, a rock, an amount of space in a house or other hollow object - all would have to be described in terms of specific items being either large or small.

9. Is there a general term for money?

Wik-Mungkan has the term *wukal* used for all money. I do not know the origin of the term. Sometimes a distinction is made, *wukal* being used for notes and 'cents' for silver. 'Brown cents' are considered to be worthless. Some do not understand that cents make up dollars. (I have had someone refuse to pay me a dollar bill for stamps and let me give them change. Instead they went home and borrowed silver to pay.)

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Work Papers of SIL-AAB
Series B Volume 8
December 1982

A REPORT ON COLOUR TERM RESEARCH IN FIVE ABORIGINAL LANGUAGES

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INTRODUCTION

In 1978 SIL (Summer Institute of Linguistics) field linguists working in five Australian Aboriginal languages participated in a colour term research project which was carried out by SIL fieldworkers in over 100 languages around the world. The project was directed by Paul Kay and Brent Berlin of the University of California at Berkeley and William R. Merrifield of the Summer Institute of Linguistics and the University of Texas at Arlington, and was funded by National Science Foundation Grant No. BNS 76-14153.

Following the completion of the field research, the data were analysed by the use of computer facilities at the University of California. A final report of the project is not yet available. The purpose of this report is to briefly outline the background of the research project and to present a preliminary, limited analysis of the data from the five Australian languages. Those interested in the more extensive computer analysis will have to await the project final report.

BACKGROUND FOR THE RESEARCH PROJECT

In 1969 Berlin and Kay (hereafter B&K) published a book ***Basic Color Terms*** which presented data on the basic colour terms of ninety-eight languages from diverse language families. The purpose of this research was to refute a widely held view in linguistics and anthropology, namely that every language has its own unique way of categorising and naming reality, and therefore speakers of different languages actually 'see the world differently'. This hypothesis has been termed the Sapir-Whorf hypothesis, after two of its most articulate proponents. Evidence for this hypothesis has often been cited from colour vocabularies. The colour spectrum is a continuous gradation of colour, with no natural divisions. Yet every language arbitrarily divides the spectrum by its colour terms; one language may have three

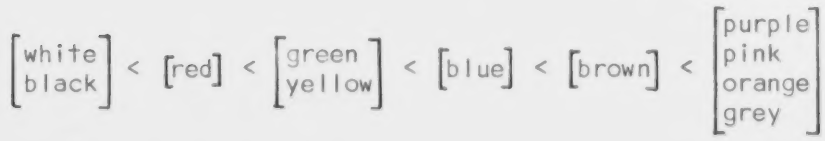
terms which label three divisions of the spectrum, while another language may divide the spectrum with ten terms. Thus, the argument goes, colour terms cannot be translated across languages but reflect a totally arbitrary and unique 'cutting up' of the colour spectrum.

In brief, B&K's data supported their doubts about the arbitrary nature of colour classification and revealed some further unexpected regularities:

> It appears now that, although different languages encode in their vocabularies different *numbers* of basic color categories, a total universal inventory of exactly eleven basic color categories exists from which the eleven or fewer basic color terms of any given language are always drawn. The eleven basic color categories are *white, black, red, green, yellow, blue, brown, purple, pink, orange,* and *grey*.
>
> A second and totally unexpected finding is the following. If a language encodes fewer than eleven basic color categories, then there are strict limitations on which categories it may encode. The distributional restrictions of color terms across languages are:
>
> 1. All languages contain terms for white and black.
> 2. If a language contains three terms, then it contains a term for red.
> 3. If a language contains four terms, then it contains a term for either green or yellow (but not both).
> 4. If a language contains five terms, then it contains terms for both green and yellow.
> 5. If a language contains six terms, then it contains a term for blue.
> 6. If a language contains seven terms, then it contains a term for brown.
> 7. If a language contains eight or more terms, then it contains a term for purple, pink, orange, grey, or some combination of these. (B&K 1969:2-3)

See figure 1 for a diagram of this colour-encoding sequence.

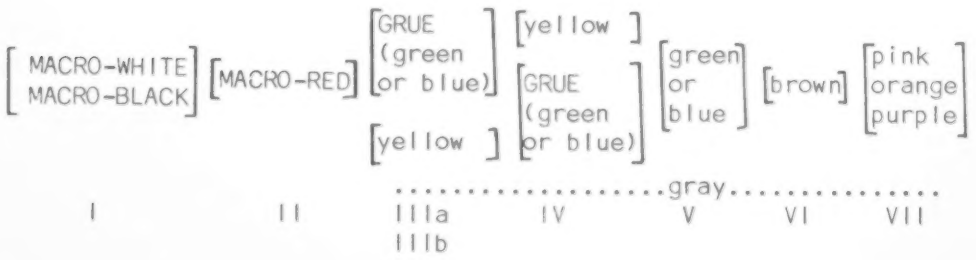
Figure 1. B&K 1969 Colour-encoding Sequence



The data supported a further hypothesis that the number of colour terms in a language correlates with the technological complexity of that language group, i.e. languages with only two or three colour terms are characteristic of groups with small-scale social and political organisation and low-level technology, while languages with eight to eleven basic colour terms are associated with complex industrial societies (B&K 1969:16)

B&K's book gained much attention. Though there were critics of the research methodology and/or the conclusions, subsequent research has largely corroborated the 1969 findings. B&K themselves, based on their own and others' research, have revised their original colour-encoding sequence, as in figure 2:

Figure 2. Revised B&K Colour-encoding Sequence
(Witkowski & Brown 1977; Kay & McDaniel 1978)



This revised sequence has been summarised by Witkowski and Brown (1981:14):

> Stage I languages . . . encode two categories, "macro-white" and "macro-black." "Macro-white" includes whites and most warm hues (reds, yellows, oranges, browns, pinks and purples) and "macro-black" includes blacks and most cool hues (blues and greens). At Stage II "macro-red," which inludes most warm hues, is encoded. With the addition of "macro-red," "macro-white" is reduced to white and very light hues. Either "grue" or "yellow" may be added at Stage III as a fourth category. "Grue" is a category including most cool hues. The encoding of "grue" restricts "macro-black" to black and very dark hues. If "grue" is added at Stage III, "yellow" is added at Stage IV and vice versa. The lexical encoding of the remaining color classes involves subdividing "macro-red" and "grue."

In this revised sequence, new colour categories are not formed by adding new colour foci, but by successively splitting up already existing categories. B&K proposed an extensive testing of their revised hypothesis, using SIL fieldworkers to gather data from

language groups with which they already worked. The data were collected from 1977 to 1979.

RESEARCH METHODOLOGY

Each field linguist (or team) was asked to interview twenty-five people, preferably monolingual. Each person was first asked to name, one by one, 330 'color chips' (squares of colour, each enclosed in a glass slide case).[1] The responses were noted on a data sheet. However, since the purpose of the research was to discover basic colour terms, these responses were subject to the following criteria which defined for B&K a 'basic color term'. Examples from English colour terms are given which are excluded by each of the criteria:

(i) It is monolexemic; that is, its meaning is not predictable from the meaning of its parts. (*bluish, blue-green, lemon-colored*)

(ii) Its signification is not included in that of any other color term. (*scarlet* and *crimson* are excluded because they are kinds of *red*)

(iii) Its application must not be restricted to a narrow class of objects. (*blond* is eliminated because it is restricted to describing hair, complexion, furniture)

(iv) It must be psychologically salient for informants. Indices of psychological salience include, among others,
(1) tendency to occur at the beginning of elicited lists of color terms,
(2) stability of reference across informants and across occasions of use, and
(3) occurrence in the ideolects of all informants. (*scarlet, mauve, burnt sienna*)

These criteria (i-iv) suffice in nearly all cases to determine the basic color terms in a given language. The few doubtful cases that arise are handled by the following subsidiary criteria:

(v) The doubtful form should have the same distributional potential as the previously established basic terms. (*red* and *white* can take the suffix *-ish*, but *aqua* and *chartreuse* cannot)

(vi) Color terms that are also the name of an object characteristically having that color are suspect, for example, *gold, silver,* and *ash*. This subsidiary criterion would

exclude *orange*, in English, if it were a doubtful case on the basic criteria (i-iv).

(vii) Recent foreign loan words may be suspect

(viii) In cases where lexemic status is difficult to assess (see criterion (i)), morphological complexity is given some weight as a secondary criterion. The English term *blue-green* might be eliminated by this criterion.

(taken from B&K's 'Instructions to Fieldworkers')

Following the lengthy task of naming the 330 colour chips, each test participant was then shown a colour chart, a piece of cardboard on which 410 circular colour patches were glued; 330 of these corresponded to the colour chips in the naming task and the remaining eighty were forty copies each of the pure white and pure black colour chips. In this 'focus mapping task', the person interviewed was asked to select the best example of each of his basic colour terms. (If the fieldworker had difficulty applying the criteria for basic colour terms, he was to include any term used by the person to name five or more chips.) These responses were noted on a 'focus mapping code sheet'.[2]

The purpose of the naming task was to indicate both the basic colour terms and the extension of each colour term (i.e. how large an area on the colour chart is designated by each term). The mapping task, on the other hand, aimed to record the focal colour(s) for each basic colour term. Research by B&K in twenty languages had shown that colour foci were concentrated in small areas on the colour chart, which indicated a high level of agreement on colour foci across languages (see figure 3).

RESEARCH FINDINGS IN THE FIVE ABORIGINAL LANGUAGES

The colour term research was carried out in the following Australian Aboriginal languages: Kuku-Yalanji, Murrinh-patha, Martu Wangka, Warlpiri and Kriol. This report is based on a limited analysis of that data. Evidence is examined for determining 'basic color terms' in each of the five languages, and a comparison is made between the focal colours chosen for each term as compared to the focal areas outlined by B&K and reproduced in figure 3. No attempt has been made to determine the extension of each colour term, since neither the facilities nor the necessary information were available for plotting each of the 330 responses made by every participant in the naming task onto the colour chart.[3]

The data for each language are summarised as follows:

Location:
Investigators: SIL fieldworkers
Test Participants: number (male and female), age range
Other languages spoken: some indication of the extent other Aboriginal languages and English are used by the test participants
Range in the number of colour terms used at least 5 times by individual test participants

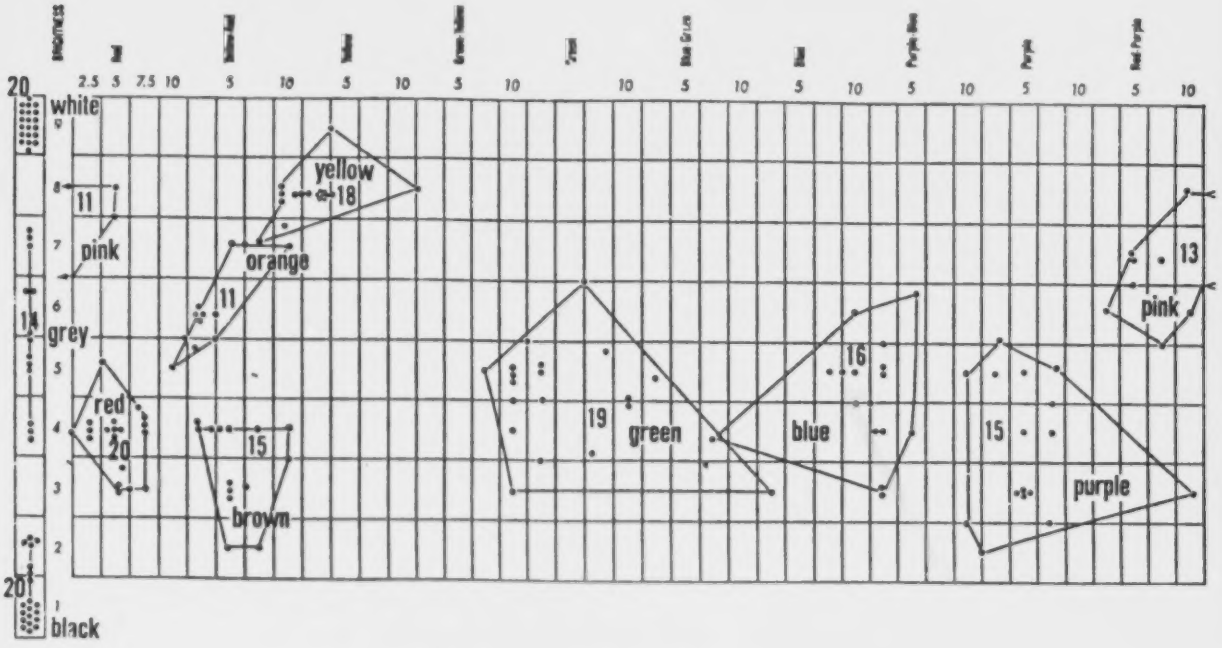
Colour terms: vernacular term; English colour-term gloss; any other known meaning of the vernacular term; no. of participants who used the term 5+ times (in brackets); only terms used by over half of the participants are listed

Colour term foci: For each vernacular colour term, a summary is given of the foci selected by the participants, in comparison with B&K's outline of focal areas (fig.3). The following example explains the notation used:
ngala-ngala: 13 f. red, 1 f. orange; 4 red. This indicates that 13 participants chose a focal colour for *ngala-ngala* which is within the red focal area shown in figure 3, and 1 chose a colour within the orange focal area; 4 chose a colour which immediately borders that red focal area; selected colours which are neither within nor bordering any focal colour area shown in fig. 3 are not noted.

Discussion: Colour terms and foci are discussed with reference to B&K's hypothesis. Additional information from the fieldworkers is noted, both from comments recorded on the data sheets and from recent personal communication.

Figure 3. Normalized Foci of Basic Color Terms in Twenty Languages

Note: Numerals appearing along the borders of the chart refer to the Munsell system of color notation. Numerals appearing on the body of the chart refer to the number of languages in the sample of twenty which encode the corresponding color category. The smallest possible number of lines are used to enclose each color area. (B&K 1969:9)*



*The colour chart used in the research project which this paper describes differs from the above chart in having an additional row of pure white at the top (40 additional white) and a complete row of pure black at the bottom (39 additional black).

Kuku-Yalanji

Location: Wujal-Wujal (Bloomfield River), Queensland

Investigators: Hank and Ruth Hershberger

Test Participants: 20 (9 M, 11 F), ages 30-70+

Other languages spoken: All 20 spoke English to some degree, but only 1 fluently. A number spoke related *'Kuku-'* dialects.

No. of colour terms used by individuals 5+ times ranged from 3 to 9.

Colour terms:

bingaji	'white, light' (20)
ngumbu	'black, dark' (20)
ngala-ngala	'red' (20)
burrkul	'dirty, nondescript' (14)
kayal	'green, unripe' (11)[4]

Colour term foci:

bingaji	19 f. white (1 person did not select a focus)
ngumbu	19 f. black (1 person did not select a focus)
ngala-ngala	13 f. red, 1 f. orange; 4 red, 1 pink, 1 no focus
burrkul	2 f. grey, 2 f. brown, 1 f. black; 2 blue, 2 yellow, 2 black
kayal	8 f. green; 1 green; 1 no focus

Discussion:

Both the investigators' comments and the data support the conclusion that the Kuku-Yalanji have three basic colour terms. This would place them in Stage II of B&K's colour-encoding sequence, with the three categories of white-light, black-coal ('macro-black'), and red-warm ('macro-red').

Two women responded with only three colour terms, those for white, black and red. The one woman (age 30-35) responded 'none' in Kuku-Yalanji for chips which she considered outside the range of these three terms. This participant was the only one noted as fluent in English, and the investigators felt that she was 'too sophisticated to give a color a name if there was no name for it'. Her response could well indicate a mapping of these three English colour categories onto Kuku-Yalanji basic colour terms.

According to the investigators, *bingaji* and *ngumbu* mean 'light' and 'dark' as well as 'white' and 'black'. Several participants appeared to name chips light or dark in comparison with the frame around the chip or in comparison with the chip just shown them previously. Terms denoting light and dark have been recorded by other researchers in Australia. Jones and Meehan, carrying out an investigation of Anbarra (north-central Arnhem Land) colour concepts, concluded that there were only two real colour terms, those for light and dark. Four additional 'colour terms' were names for mineral pigments and could only be used to describe a limited range of objects (Jones and Meehan 1978:26-30). Davis found that children at Milingimbi, also in Arnhem Land, first classified all colours as *watharr* 'light' or *mol* 'dark'. As they got older, they added further terms which classified colours by hue and saturation as well as brightness (Davis 1982).

The term *burrkul* seemed, according to the investigators, to be used for colour chips that could not be classified under other colour terms. One person indicated on the colour map display that *burrkul* covered all colours not in the white, black or red areas, and the investigators noted the same extension of this term for another participant.

The fifth term, *kayal*, could become in time a basic colour term for green (or blue-green 'grue' if B&K's sequence is followed). Several people used *kayal* 'unripe' as well as *kulbul* 'ripe' to name various colours depending, according to the investigators, 'on the fruit or leaf being thought of'. But it is significant that nine out of eleven who used *kayal* focused it in or bordering B&K's green focal area.

Murrinh-patha

Location: Wadeye (Pt. Keats), NT

Investigators: Chester and Lyn Street

Test Participants: 25 (10 M, 15 F), ages 35-75

Other languages: a variety of other Aboriginal languages spoken fluently or to some degree; all participants spoke English 'a little' or to some degree, but none fluently.

No. of colour terms used by individuals ranged from 3 to 10.

Colour terms:

bamam	'white' (25)
thipmam	'black' (25)
bukmantharr	'red' (25)
wudanil	? (23)
ngatin	? (20)
tumamka~tupmamka	? (19)
wipma(na)narri	? (16)

Colour term foci:

bamam	25 f. white
thipmam	25 f. black
bukmantharr	15 f. red, 1 f. orange; 1 red, 2 pink, 1 purple, 1 brown
wudanil	4 f. yellow, 3 f. orange, 1 f. pink, 1 f. green; 4 purple, 2 pink, 1 green, 1 orange
ngatin	12 f. yellow, 3 f. green, 2 f. orange
tumamka~tupmamka	6 f. blue, 3 f. green, 1 f. brown, 1 f. purple; 2 blue, 2 purple
wipma(na)narri	2 f. yellow, 2 f. brown, 1 f. red, 1 f. orange, 1 f. purple; 1 black, 2 brown

Discussion:

The data, along with the investigator's statement that *'bamam, thipmam* and *bukmantharr* are the only words that apply solely to colours', support the conclusion that the Murrinh-patha have only the three basic colour terms. If the foci selected for *bukmantharr* (all of which are warm hues, including the four not noted) are an accurate reflection of the extension of this term, then *bukmantharr* designates a macro-red (red-warm) category, as in B&K's Stage II.

It was not possible to assign an English colour-term gloss to the other four terms, nor did categories such as light/dark, warm/cool accurately describe the variety of foci chosen. Chester Street, in further correspondence, supplied the following meanings for the four terms:

wudanil	(verb form) 'sandy/ginger colour, used for describing fairish hair as on Aboriginal people etc.'
ngatin	'unripe (fruit), raw (meat)'; also used for green grass
tumamka~tupmamka	'blurry vision'; indicates the colour is not clear or good
wipma(na)narri	'brownish, like the back of a kangaroo'

Martu Wangka

Location: Jigalong, WA

Investigators: Jim and Marjorie Marsh

Test Participants: 25 (12 M, 13 F), ages 19-70+

Other languages: Martu Wangka includes 2 closely related dialects: Mantjiltjarra, spoken by 17 participants, and Kartujarra, spoken by 8. Seventeen spoke English 'a little' or 'very little', and a few other Aboriginal languages were also spoken.

No. of colour terms used by individuals ranged from 2 to 12.

Colour terms:

maru-maru (~maru)	'black' (24)
miji-miji	'red' (*miji* 'blood') (24)
yukuri-yukuri	'green' (*yukuri* 'grass') (22)
karntawarra	'yellow' ('yellow ochre') (16)

Colour foci:

maru-maru	24 f. black
miji-miji	19 f. red; 4 red, 1 pink
yukuri-yukuri	11 f. green, 1 f. yellow; 6 green
karntawarra	12 f. yellow, 1 f. orange, 1 f. white

Discussion:

The Martu Wangka data do not present a clear-cut distinction between basic and non-basic colour terms. However, there is evidence that traditionally the basic terms were those for black and red. The SIL fieldworker, Jim Marsh, has stated (pers. comm.) that these are the only terms he has heard used as general colour names. There is greater agreement in the use of these two terms and also in their foci. (The one participant who did not use ***maru-maru*** used another term, ***mungapuru***, adjective form of ***munga*** 'night, darkness', which he focused in the black focal area, and the one participant who did not use ***miji-miji*** likewise focused another term, ***miny-miny***, in the red focal area.) One woman age 60+ used only the terms for black and red to name all 330 colour chips. (See Appendix for an idea of the extension of these two terms in her naming task.)

Two participants used only three terms. A man age 19 used the terms ***maru-maru***, ***miji-miji*** and ***yukuri-yukuri***, and a woman age 65+ used the terms ***maru-maru***, ***miji-miji*** and ***pirilypa***, the latter focused in the white area.

The primary question raised by the data in comparison with B&K's colour-encoding sequence is the absence of a basic term for white—or even for 'macro-white'. According to the sequence, a language with two basic colour terms has the categories 'macro-black' and 'macro-white' and foci for the latter can be expected to vary between white and red, while the former may have foci in black, green or blue (Kay & McDaniel 1978:639). The Martu Wangka data, however, show clear categories focused in black and red. Twenty-two participants did focus a colour term in the pure white area, but a variety of terms were used, and five participants used two or three terms. In all, twelve different terms were used which were focused in white (in addition to ***karntawarra***, noted above). For some of these terms the investigator could supply the meaning, or a possible meaning or derivation:

piily-piily	'dusty, as of someone white from dust'
piirl-piirl	'white sediment in a salt pan'
pira-pira	(may be variant of ***piila-piila*** or may come from ***pira*** which is resin [dark reddish] from a tree with white bark)
warla	'salt lake'
mirta-mirta	from Nyangumarta ***mirta*** 'grey-haired'

The other terms were unknown to him though several (e.g. *piila-piila, pirilypa, pilya*) appear to be related to known words.

The woman mentioned above who used only *maru-maru* and *miji-miji* was asked by the investigator about the colour of ashes and the colour of a 'stark white gum tree'. She replied with the term *piinta* (meaning unknown) 'but she still considered this colour absent from the chips'.

This same lack of agreement on a term for white is found in the Warlpiri data, though to a lesser extent (see below). Both Martu Wangka speakers and the Warlpiri are traditionally desert dwellers, from the same general area. The Martu Wangka dialects, Mantjiltjarra and Kartujarra, are dialects of the 'Western Desert language'.[5] In a dictionary of another Western Desert dialect, Pintupi, a number of terms are given for 'white', referring to specific entities such as white animal, white gum tree, white stone. A general term for white *(tjulkura)* is listed first, but this term also appears to have specific references, as it is 'also used of white ochre, white animals' (Hansen & Hansen 1977). Douglas (1976), writing briefly of colour classification in 'the Western Desert language area', lists two 'specific colour words': *maru* 'black' and *pirntalpa* 'white, shiny'.[6] However, the designation of the latter as a basic colour term may be questionable since *pirntarlpa* in Martu Wangka refers to the white meat of a goanna (J. Marsh, pers. comm.).

The above data suggest that Aboriginal groups who were traditionally desert nomads did not abstract the colour white as a separate property of a variety of natural phenomena, and therefore it cannot be considered a basic colour term in their language.

Another possibility is that the lack of agreement on a term for white in the colour research may have been due to the testing material which was foreign and unnatural to the participants. Jones and Meehan, in their colour research among the Anbarra (Arnhem Land), noted the reaction of one man to the Munsell colour chart: 'At first, Gurmanamana said there were no *-gungaltja* ('light, white') colours there at all and pointed from the chart to a piece of reflective foil used for cooking, lying on a bench in the tent, "That one there, properly number one *gun-gungaltja,* no more this mob"...The true *-gungaltja* colours require a touch of brilliance or "animation" as well as a high degree of brightness' (Jones and Meehan 1978:27). One criticism of B&K's research is that the colour chips are all in the 'surface mode' and lack the three-dimensional quality of the real world. Perhaps if the Martu Wangka (and Warlpiri) participants had been shown white objects rather than flat chips there might have been greater agreement on a term for white.[7] Note that the gloss given by Douglas for *pirntalpa* includes the meaning 'shiny' as well as 'white'.

Twelve Martu Wangka participants used the term *parnaly-parnaly* or *parna* 'earth', which they focused in brown, orange and pink areas of the chart. Compare this with Warlpiri *walya-walya* (*walya* 'earth') below.

Warlpiri

Location: Lajamanu (Hooker Creek), NT

Investigators: Steve and Bev Swartz

Test Participants: 23 (14 M, 9 F), ages 30-70+

Other languages: 4 participants were monolingual, 7 spoke another Aboriginal language (Gurindji, Walmajarri, Pintupi), 16 spoke Pidgin English or English but none fluently.

No. of colour terms used by individuals ranged from 3 to 12.

Colour terms:

yalyu-yalyu	'red' (*yalyu* 'blood') (20)
karntawarra	'yellow' ('yellow ochre') (20)
maru-maru~maru	'black' (19)
walya-walya	? (*walya* 'earth') (16)
kardirri	'white' (15)
yukuri-yukuri	'green-blue (grue)' (*yukuri* 'green plants') (14)[8]

Colour term foci:

yalyu-yalyu	8 f. red, 3 f. pink, 1 f. purple, 1 f. grey, 1 f. black, 1 f. blue; 4 red, 1 pink
karntawarra	10 f. yellow, 4 f. orange, 1 focused in both yellow & orange, 2 f. white
maru-maru	13 f. black, 1 f. brown, 1 f. grey, 1 f. blue; 2 purple
walya-walya	3 f. brown, 3 f. purple; 3 brown, 1 yellow, 1 orange
yukuri-yukuri	9 f. green, 1 f. blue; 1 green, 1 blue

Discussion:

On the basis of the above compiled data, it is difficult to determine basic colour terms for Warlpiri. No term was used by all twenty-three participants and there is a fair bit of overlap in the focal colours. As mentioned in the discussion of the Martu Wangka data, the Warlpiri participants also used several terms which they focused in pure white. Of the fifteen who used *kardirri*, four gave no focal colour for it and five used an additional term which they also focused in white. Of the eight who did not use *kardirri*, three used another

term which they assigned a white focus. In all, five terms were used for white. The investigator was not sure of the meaning of these terms but suggested that they might be dialect differences referring to 'anything shiny'. Or it may be, as in Martu Wangka, that they refer to specific natural phenomena such as salt pans, white clay.

Two men age 70+ used only three terms 5+ times: ***yalyu-yalyu***, ***maru-maru*** and ***parkarra*** (meaning not known). The one man assigned no focus to the last term, and the other man focused it in the grey focal area, along with ***maru-maru***. The second man was present while the first man was interviewed, which may be responsible for the agreement on these three terms. (A third man, age 65+, used five terms which indicated periods of the day such as night-time, sunset and sunrise.) Again, the evidence is not clear for determining traditional basic colour terms.

In summary, the data appear not to support B&K's hypothesis but to reflect the influence of culture upon colour nomenclature, namely that the colours important to desert Aboriginals are those first encoded: yellow-orange (***karntawarra***), reds (***yalyu-yalyu***), black (***maru-maru***) and brownish earth hues (***walya-walya***). Or one might argue that the Warlpiri (and others) have no basic colour terms, no term universally used to name a colour category common to a variety of phenomena. This would again reflect the interaction of language and culture, that those distinctions not important to a group may not be encoded in their language.

Kriol

Location: Ngukurr (Roper River), NT

Investigators: John and Joy Sandefur

Test Participants: 25 (12 M, 13 F), ages 18-65+

Other languages: 12 spoke 1 or more traditional Aboriginal languages fluently; 9 spoke English fluently, and 11 spoke some English.

No. of colour terms used by individuals ranged from 3 to 11.

Colour terms:

red	'red' (24)
blu	'blue' (24)
grin	'green' (24)
blek	'black' (23)
yela	'yellow' (23)

wait 'white' (22)
bran 'brown' (22)
pingk 'pink' (21)
pepul 'purple' (21)
orinj 'orange' (17
grei 'grey' (16)

Colour term foci:

red 17 f. red, 2 f. purple, 1 f. orange; 2 red, 2 pink
blu 18 f. blue; 5 blue, 1 green
grin 22 f. green; 1 green
blek 22 f. black; 1 blue
yela 17 f. yellow, 1 f. orange, 1 f. both orange & yellow; 3 yellow, 1 white
wait 21 f. white (1 no focus)
bran 15 f. brown, 1 f. both brown & grey; 2 brown, 1 black
pingk 7 f. pink, 4 f. purple, 1 f. both pink & purple, 1 f. red; 5 pink, 1 red
pepul 14 f. purple, 2 f. pink, 1 f. orange; 3 purple
orinj 11 f. orange, 2 f. yellow, 1 f. pink, 1 f. purple, 1 f. brown
grei 10 f. grey, 1 f. white; 2 grey, 2 white, 1 pink

Discussion:

The Kriol data reflect a situation of cultural and linguistic change, in which English colour terms are at different stages of incorporation by Kriol speakers. There is no evidence for a division into basic vs. non-basic colour terms. Seven of the participants used all eleven colour terms, and eight used all but one. In charting the eleven terms for the twenty-five participants, there were significantly more 'blanks' at the bottom of the chart: twenty-seven blanks in the ***bran-pingk-pepul-orinj-grei*** group as compared to ten in the ***red-blu-grin-yela-blak-wait*** group. A few participants used other terms to denote colour, such as ***dak*** 'dark', ***lait*** 'light', ***shaini*** 'shiny' and ***chokoleit*** 'chocolate'.

It appears that the incorporation of English colour terms into Kriol has been accompanied by an incorporation, to a high degree, of their focal referents. (English is one of the twenty languages whose colour foci are represented in figure 3.) One might have expected a more confused picture in terms of the foci chosen. The computer analysis could reveal considerable differences between Kriol and English in the extension of the eleven colour terms, i.e. Kriol *grin*, for example, might well extend into hues that most English speakers would label 'blue', or vice versa.[9]

The investigator noted on the data sheets that six of the participants

had learned Kriol as a second language. Five of these used from nine to eleven of the eleven colour terms. However, one woman age 20, whose mother tongue is Wagalak, used only three terms: ***wait, blek*** and ***red***. These may have reflected the basic terms in Wagalak. A woman about 55 years old and a mother tongue Kriol speaker offered the comment that ***red, wait*** and ***blek*** are the main colours, adding that '***yela*** is the head colour for ***grin, blu, orinj, bran; red*** is the head colour for ***pingk, pepul; wait*** is the head colour for ***grei***'.

CONCLUSION

In summary, the data presented in this report appear to have cast a 'tie vote' in regard to B&K's hypothesis: 2 supporting (Kuku-Yalanji and Murrinh-patha), 2 questioning (Martu Wangka and Warlpiri) and 1 neutral (Kriol, with its English borrowings). The further analysis undertaken by B&K, in mapping the extension of all terms used by all participants, could well change this conclusion. It may be that the focal data is misleading and that comparison of the colour categories as a whole for each participant may agree with B&K's colour-encoding sequence. But at this point we must conclude that the Martu Wangka and Warlpiri data do not support either B&K's 1969 colour-encoding sequence or the revised sequence (Kay and McDaniel 1978:639) in regard to Stage I colour categories.

B&K, in their research proposal, stated their plan to have the research carried out in 'languages spoken by peoples who have had little contact with the Western world'. They recognise that such contact may affect the colour-encoding sequence—and had been criticised for using bilingual test participants with a great deal of Western contact in their earlier research. Though most of the Aboriginal participants in the research reported on here spoke limited English (and a number spoke no English, particularly among the Martu Wangka and Warlpiri), yet these language groups have had considerable Western contact. Therefore the validity of the research results as a test of B&K's hypothesis may be questionable. For example, there is little evidence of the 'macro' categories in the foci chosen for basic colour terms, i.e. terms for black are focused in black, not in black and/or cool colours, and 'white' is focused in white rather than white and warm (or 'red' focused in red rather than red and warm) for those languages having only two or three basic terms. At a number of points the data suggest a culture change situation in which Aboriginal people are using vernacular terms (quite often names of particular natural objects) to name colours which they recognise are basic colour categories in English, rather than a situation in which vernacular basic colour terms are being developed according to B&K's sequence. It seems reasonable that such a process (adapting vernacular terms to English categories) would be even more apparent in a testing situation using foreign material such as colour chips. The Kriol data indicates how quickly colour categories from a

dominant culture can be incorporated into the vocabulary. (Cf. the Kriol colour-term lists with those of the English speakers in the Appendix.)

This report has not touched upon a basic question which comes to mind in comparing colour categories cross-culturally: do differences in the number of colour terms reflect differences in perception? It seems plausible that there might be different levels of skill in colour perception, as there are differences in other areas of sense perception. For example, Aboriginal people are known for their highly developed skills in perceiving and interpreting visual clues in animal tracks, a skill important to a traditionally hunting and gathering people. Following this line of thought, people in technological cultures, in which a multitude of colours are man-made, would develop greater skill in perceiving colour differences.

This explanation of cross-cultural differences in colour categories was accepted in the early days of colour research. However, it is now generally discounted (though not entirely disproven). In Appendix II of ***Basic Color Terms*** B&K cite the research of Magnus in 1880 which specifically aimed to separate colour-discernment data from colour-naming data. They accept Magnus' conclusion that 'the ability to perceive color is no less developed in primitive peoples' but that there are 'considerable differences in the development of the color lexicon' (B&K 1969:140-1). B&K (1969:16) suggest the following possible reasons for the development of larger colour lexicons in technologically more complex cultures: 1) there is an overall increase in vocabulary as a culture becomes more complex, and this increase is reflected in colour terminology; 2) the greater use of man-made dyes and the proliferation of colours in man-made products results in colour being more in focus and more important in identifying objects; 3) for people who live closer to nature, there is little adaptive value in abstracting broad colour categories such as 'green'; it is more important to recognise the fine shades of green which are peculiar to individual plants.

Recently B&K's findings have been used to support a particular theory of human colour vision, the 'opponent color theory' of Hering (proposed in 1874 but then abandoned) which stated that 'colour vision is based on three pairs of opponent processes': the perception of dark and light, red and green, blue and yellow (Wattenwyl & Zollinger 1979:280). This correlates with the early encoding of these colours in B&K's sequence. Such use of the colour-encoding sequence to support a theory of human colour vision further indicates the complex of factors involved in colour term research. Colour vocabulary is not just language data, for it relates to cognition and perception, to language, culture, culture change, and human physiology. And the data gathered in colour term research may not fit so neatly into a single, simple model.

FOOTNOTES

[1] The 330 chips from the Munsell Color Company are based on a classification of colours in terms of hue, brightness and saturation. In layman terms, hue is what we commonly refer to as 'color', i.e. red vs. green vs. yellow. Brightness refers to 'dark' vs. 'light', such as dark green vs. light green. Saturation refers to intensity, or 'strong' vs. 'weak' colours ('best exemplified by the extremes of psychedelic art' Collier 1973:246). For a summary of a more technical description of colour, see Jones & Meehan 1978 or Davis 1982. On the mapping display used in the second part of the research, the 330 Munsell colours are arranged vertically in eight degrees of brightness and horizontally in forty equally spaced hues. All colour chips are displayed at maximum saturation.

[2] Those familiar with the difficulties of translating such concepts as 'best' and 'colour' into Aboriginal languages may wonder how the field investigators communicated what they wanted the test participants to do. Use was made of the English loan word 'colour' (already present in Kriol as *kala*), and English or known vernacular colour terms were cited as examples. For the mapping task, which involved selecting the 'best' example of each colour, the investigator phrased the question as, for example, 'Which one is the boss of the reds?'.

[3] The 330 chips were not arranged, of course, in any order corresponding to that on the colour chart, since this would have made colours with minimal distinctions follow each other and thus made the naming task difficult. The research material contains no key which identifies a colour chip with that same colour's position on the chart.

[4] In the Kuku-Yalanji dictionary compiled by Hank and Ruth Hershberger (1982), the following meanings are given for the colour terms listed:

bingaji	(adj) 'white or light coloured' (n) 'a white-haired man or woman'
ngumbu	'black, charcoal'
ngala-ngala	'red' in the Kuku-Nyungkul dialect; the Kuku-Yalanji word for red is given as *mula-mula* (*mula* 'blood')
burrkul	is listed as *burkul* with the meaning 'not clear, not clean, murky, dirty, dusty'
kayal	1. 'unripe, green'. 2. 'raw'

[5] 'Western Desert language' is the cover term for a number of dialects which include, among others, Pitjantjatjarra in South Australia, Pintupi in the Northern Territory, and Mantjiltjarra and Kartujarra (Martu Wangka) in Western Australia.

[6] In addition to the two specific colour words, Douglas lists five 'pigment names', terms for charcoal, white pipe clay, red ochre, yellow ochre and blood. He also gives a general name for colour: 'All pigments . . . come under the general name of ***walka***. This is also the word for "colour," "paint" and the finished painting' (Douglas 1976:6-7). Jim Marsh has commented (pers. comm.) that ***walka*** in Martu Wangka means 'mark, design' and the verb form ***walkajunu*** means 'to paint, decorate'. It does not have the general sense of 'colour'.

[7] Jim Marsh (pers. comm.) points out that Western Desert dialects characteristically have many synonyms. This language feature reflects a past demography in which small, scattered groups developed their own dialects (or even 'idiolects') but also shared a great deal of vocabulary through such contacts as ceremonial gatherings. Thus a Martu Wangka speaker could know and use a variety of terms, even a variety of basic terms, for a colour such as white.

[8] Warlpiri, Martu Wangka and Kuku-Yalanji all have some colour terms formed by reduplication of a noun which is the name of something having that colour. The Warlpiri investigator, Steve Swartz, has commented that reduplication in such instances appears to change the noun into a colour adjective. Douglas gives the same explanation for several 'colour adjectives' in the 'Western Desert language area' (Douglas 1976:8). Jim Marsh states that one of the functions of reduplication is to abstract a quality of the unreduplicated nœun.

[9] John and Joy Sandefur have mentioned (pers. comm.) a few examples of Kriol speakers labeling colours differently than they themselves perceived them: 1) a horse they would describe as 'grey' was described by a Kriol speaker as a ***bluwan*** 'blue one'; 2) a 'black and tan' dog was described as being ***blu*** 'blue' and ***rili kaladwan*** 'really coloured one' by an older Kriol-speaking woman; 3) 'white people (i.e. Anglo-Saxons) have been referred to by a number of people as being ***redbala***' ('red person'), though the Sandefurs note that this may describe Whites who are reddened by the sun.

APPENDIX

To give some indication of the variety of responses recorded in the colour chip naming task, the colour terms given to name the first fifty-six colour chips (the first row of chips in the test) are listed for two participants from each of the five Aboriginal languages. A male and female participant have been selected from each language, and an attempt has been made to select both a younger and an older participant. Two English speakers (one Australian and one American) were also asked to name the colours of the first fifty-six chips, and their responses are recorded for comparison.

To make comparison easier, vernacular terms that have been tentatively identified as basic colour terms in this report are represented in the lists by their English colour-term gloss; all Kriol colour terms are represented by English glosses. Vernacular terms whose meanings are known either from comments on the data sheets or from personal communication with the investigators are as follows:

Kuku-Yalanji:	*kayal*	'green, unripe'
	barrkal	'dirty, nondescript'
	janbal	'var. of quondong' (bluish in colour)
Murrinh-patha:	*wudanil*	'sandy/ginger colour, used for describing hair'
	tumamka	'blurry vision' (colour not clear or good)
	ngirrwu	'salt water clay' (red-orange in colour)
	wipmanarri	'brownish, like the back of a kangaroo'
	ngatin	'unripe (fruit), raw (meat)' also used for green grass
	wudanwuwu	'yellow-brown colour as dried grass' (the word is made up from the word for one of the spear grass types)
Martu Wangka:	*yukuri*	'grass'
	karranjiyal	'something clean'
	karntawarra	'yellow ochre'
	pujurr	'red ochre'

Warlpiri:	*kardirri*	possibly means 'something shiny'
	kunjuru~kunyjuru	'smoke'
	walya	'earth'
	karntawarra	'yellow ochre'
	yukuri	'green plants, wet season'

The following abbreviations and notations are used:

brwn	brown	prpl	purple
grn	green	ylw	yellow
org	orange		

A raised 2 at the end of a vernacular term indicates that the term is reduplicated:

yukuri^{2} = *yukuri-yukuri*

A question mark indicates the term used could not be clearly deciphered from the data sheet.

	Aus. English	Amer. English	Kuku-Yalanji		Murrinh-patha		Martu Wangka		Warlpiri		Kriol		
	F 30s	M 40s	M 60+	F 30s	F 52	M 40	F 60+	M 40+	M 70+	F 30	F 50s	M 18	
1.	blue	blue	*janbal*	*burrkal*	white	*tumamka*	black	black	black	black	blue	blue	.1
2.	light blue	light blue	(?)	white	white	*tumamka*	black	*yukuri*[2]	*parkarra*	*kunjuru*[2]	grn	blue	.2
3.	red	red-org	red	red	red	*ngirrwu*	red	red	*rtiri*[2]	red	red	org	.3
4.	mauve	prpl	black	*burrkal*	red	*tumamka*	red	red	red	*kunjuru*[2]	brwn	prpl	.4
5.	sea grn	light grn	*kayal*	white	white	*wudanil*	black	*yukuri*[2]	*parkarra*	*kunjuru*[2]	grn	grn	.5
6.	apricot	flesh	*burrkal*	*burrkal*	white	*wudanthewu*	red	*karranjiyal*	*parkarra*	*walya*[2]	brwn	pink	.6
7.	grass grn	ylw-grn	*kayal*	red	black	*wudanil*	black	*yukuri*[2]	*kuru*[2]	*yukuri*[2]	grn	grn	.7
8.	maroon	mauve	red	*burrkal*	red	*tumamka*	red	red	red	red	red	red	.8
9.	brwn	light brwn	*burrkal*	white	red	*wipmanarri*	black	*karranjiyal*	red	*walya*[2]	brwn	brwn	.9
10.	junior blue	navy blue	black	red	red	*tumamka*	black	black	black	*kunjuru*[2]	blue	blue	.10
11.	dark grn	dark grn	red ?	*burrkal*	white	black	black	black	black	*kunjuru*[2]	grn	blue	.11
12.	ylw	ylw	*burrkal*	white	red	*ngatin*	red	*karntawarra*	*parkarra*	*karntawarra*[2]	ylw	ylw	.12
13.	dark grn	dark grn	black	*burrkal*	white	black	black	black	black	*yukuri*[2]	grn	grn	.13
14.	dark blue	blue-grey	black	white	black	black	black	black	black	*kunjuru*[2]	blue	blue	.14
15.	pink	pink	*burrkal*	red	white	*ngirrwu*	red	*karranjiyal*	red	*rrapa*	pink	pink	.15
16.	off-white	white	white	white	white	white	black	*karranjiyal*	*kardirri*	*kardirri*	grey	white	.16
17.	tangerine	red	red	red	red	*ngirrwu*	red	red	red	red	red	red	.17
18	dark brn	black	black	*burrkal*	black	black	black	black	black	black	black	black	.18
19.	blue	aqua	*janbal*	red	white	*wudanil*	black	black	black	*kunjuru*[2]	blue	blue	.19
20.	grass grn	ylw-grn	*kayal*	white	*wudanil*	*wudanil*	black	*yukuri*[2]	black	*yukuri*[2]	grn	grn	.20
21.	pink	pink	red	*burrkal*	red	red	red	red	red	red	pink	pink	.21
22.	sunshine ylw	pale ylw	white	white	white	*ngirrwu*	red	*karntawarra*	*parkarra*	*karntawarra*[2]	ylw	ylw	.22
23.	mauve	violet	*burrkal*	*burrkal*	red	*tumamka*	red	red	red	*kunjuru*[2]	prpl	prpl	.23
24.	olive green	dark olive grn	black	red	black	*wipmanarri*	black	black	black	black	grn	brwn	.24
25.	aqua	turquoise	*janbal*	*burrkal*	white	*wudanil*	black	black	black	*yukuri*[2]	blue	blue	.25
26.	blue	blue	*janbal*	white	black	*tumamka*	black	black	black	*kunjuru*[2]	blue	blue	.26
27.	beige	pale pink	white	red	white	white	red	*karranjiyal*	*parkarra*	*kardirri*	white	white	.27
28.	pink	pink	red	*burrkal*	red	*ngirrwu*	red	red	red	red	pink	pink	.28
29.	sea grn	light grn	*kayal*	white	white	*wudanil*	black	*yukuri*[2]	black	*yukuri*[2]	grn	grn	.29
30.	burnt org	org	?	*burrkal*	white	*wudanthewu*	black	*karranjiyal*	red	*walya*[2]	brwn	brwn	.30
31.	light blue	pale blue	white	white	white	*tumamka*	black	*yukuri*[2]	*parkarra*	*kunjuru*[2]	blue	blue	.31

32.	mauve	violet	*burrkal*	red	red	*ngirrwu*	red	red	red	red	pink	pink	.32
33.	lime green	ylw-grn	*kayal*	*burrkal*	white	*wudanil*	black	*yukuri*[2]	black	*yukuri*[2]	grn	blue	.33
34.	turquoise	blue	*kayal*	white	white	*tumamka*	black	black	black	*kunjuru*[2]	blue	blue	.34
35.	tangerine	pink	red	red	red	*ngirrwu*	red	*karranjiyal*	red	red	orange	pink	.35
36.	dark grn	dark grn	black	white	black	*wudanil*	black	black	black	*yukuri*[2]	grn	grn	.36
37.	blue	pale blue	*burrkal*	white	white	*tumamka*	black	black	black	*kunjuru*[2]	blue	blue	.37
38.	maroon	mauve	red	*burrkal*	red	red	red	red	red	*yukuri*[2]	red	prpl	.38
39.	grass grn	green	*burrkal*	red	black	*wudanil*	black	*yukuri*[2]	black	red	grn	grn	.39
40.	sky blue	aqua	white	white	red	*wudanil*	black	*yukuri*[2]	black	*kunjuru*[2]	blue	blue	.40
41.	maroon	deep red	red	*burrkal*	black	*ngirrwu*	red	red	red	red	red	brwn	.41
42.	ylw	ylw	*burrkal*	red	white	*wudanwuwu*	red	*karntawarra*	black	*karntawarra*[2]	grn	ylw	.42
43.	navy blue	navy blue	black	white	black	*tumamka*	black	black	black	*kunjuru*[2]	blue	blue	.43
44.	off white	pale prpl	white	*burrkal*	white	white	black	*karranjiyal*	*parkarra*	*kardirri*	white	white	.44
45.	sea grn	grn	*kayal*	white	black	*wudanil*	black	*yukuri*[2]	*parkarra*	*yukuri*[2]	grn	grn	.45
46.	grey	grey	*burrkal*	red	black	*tumamka*	black	*karranjiyal*	black	*kunjuru*[2]	grey	grey	.46
47.	dark grn	dark grn	*burrkal*	white	black	*wudanil*	black	black	black	*yukuri*[2]	grn	grn	.47
48.	ylw	ochre	white	*burrkal*	white	*wipmanarri*	black	*karntawarra*	red	*karntawarra*[2]	ylw	ylw	.48
49.	sky blue	aqua	white	red	white	*wudanil*	black	*yukuri*[2]	black	*kunjuru*[2]	blue	blue	.49
50.	prpl	prpl	black	white	red	*tumamka*	red	red	red	*kunjuru*[2]	prpl	prpl	.50
51.	brwn	brwn	white	*burrkal*	white	*wipmanarri*	black	*karranjiyal*	red	*walya*[2]	brwn	brwn	.51
52.	off white	very pale grn	white	white	white	white	black	*karranjiyal*	*parkarra*	*kardirri*	grn	white	.52
53.	violet	mauve	black	red	red	red	red	red	red	red	red	pink	.53
54.	olive grn	ylw-grn	black	white	white	*wudanil*	black	*yukuri*[2]	black	*yukuri*[2]	grn	grn	.54
55.	blue	aqua	white	*burrkal*	white	*tumamka*	black	*yukuri*[2]	black	*kunjuru*[2]	blue	blue	.55
56.	apricot	flesh	white	red	white	*ngirrwu*	red	*pujurr*[3]	*parkarra*	*walya*[2]	pink	pink	.56

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